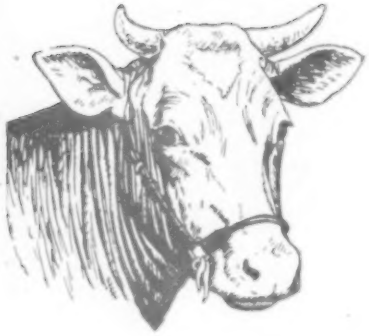
Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

Contents continued on adv. pages 2 and 4

Vol. 132 **January 1, 1958** **No. 1**



Triple protection with

CSL

POLYFRINGENS

Clostridium Perfringens Antitoxin

covering

Types B, C, and D

Difficulties of diagnosis are removed when, with one injection, you can provide immediate passive immunity against three types of enterotoxemia. All Polyfringens donor horses are tested before they are bled for production (no substandard serum is allowed to dilute our product). These high standards assure the potency which produces results. Unit potency of CSL Polyfringens is stated on each label. Because enterotoxemia is widespread, maintaining a supply of CSL Polyfringens is a wise precaution for practitioners in dairy or range areas.

CSL

CORN STATES LABORATORIES, INC. 1124 HARNEY ST., OMAHA, NEBRASKA

NORCALCIPHOS

For better milk fever therapy

1. Longer, more effective therapeutic action because calcium, phosphorus and magnesium are in metal-organic form—in contrast to rapidly eliminated, irritating inorganic compounds.

2. Magnesium is available as magnesium gluconate—less irritating and more slowly ionized than magnesium chloride.

3. Unexcelled results in complicated cases. Balanced formula of calcium, magnesium, dextrose and phosphorus is especially valuable in complicated cases and in helping to prevent relapses.

4. Exceptional stability. No troublesome precipitation to slow up treatment. Non-precipitating even after freezing.

Save with these quantity discounts

Doz. 500 cc. $9.50; 3 Doz. @ $9.22; 6 Doz. @ $9.03; 12 Doz. @ $8.55

Norden® **NORDEN LABORATORIES** LINCOLN, NEBR.

Journal of the American Veterinary Medical Association

CONTENTS

(Continued from Cover)

SURGERY AND OBSTETRICS

CLINICAL DATA

NUTRITION

CURRENT LITERATURE

Abstracts

Books and Reports

$15.00 per Annum **Single Copies, $ .75 Prepaid in U.S.**
Canada and Pan American Countries, $15.50; Foreign, $16.50
Published semimonthly at 600 S. Michigan Ave., Chicago 5, Ill., by the American Veterinary Medical Association. Second class mail privileges authorized at Chicago, Ill., January, 1956. Additional entry at Mendota, Ill.

Correspondence

Excerpts from Letters to the Editor

The following excerpts of letters from authors are quoted anonymously to show typical reactions to editorial staff efforts to improve veterinary medical writing.

Sept. 4, 1957

Sir:

We are most appreciative of your comments and helpful criticisms of our manuscript. We are in complete agreement on most of the suggested revisions which we believe improve the manuscript for brevity and clarity.

June 10, 1957

Sir:

After declaring I would never again let myself in for an ulcerogenic hassle with the editorial staff of the *J.A.V.M.A.*, here goes. . . .

Oct. 30, 1957

Sir:

The manuscript has been revised in accordance with most of the suggestions offered by the editorial staff of the AVMA. Such constructive criticisms and suggestions are appreciated and do much to make the literature more readable.

Oct. 3, 1957

Sir:

While it is the editor's prerogative to change certain phraseology and to correct grammar and otherwise shorten the paper, it is not his right to infer meaning nor to change meaning. This has been done . . . in this paper.

Nov. 4, 1957

Sir:

The reviewer's three suggestions were much appreciated. I am always thankful that someone else has a chance to read my papers before they are printed. Generally, it is possible to make improvements, and to avoid regrets later on.

Aug. 13, 1957

Sir:

Some editorial changes have been made which change our meaning, and some things have been omitted which we consider important. . . . It is our belief that the practicing veterinarian is gaining increasingly more information about statistical significance and that it is unwise to underestimate his ability along these lines. We are otherwise entirely in agreement with the editorial changes.

Sept. 16, 1957

Sir:

I return herewith the galley proof . . . I can not find an error in it. I congratulate you and your staff for taking out the mistakes we had in it [the manuscript].

CONTENTS—*Continued*

Oct. 4, 1957

Sir:

Since you are doubtlessly familiar with the poor style in many of our important scientific journals, I trust you will not misinterpret my compliments to you on the abilities of your editorial staff. In my personal opinion, your revision of this manuscript is masterly, although also mortifying to us, since most of the now obvious faults were of a type that we try hardest to correct before submission for publication.

Nov. 1, 1957

Sir:

Recent editorial comment in the *J.A.V.M.A.* on word usage, manuscript form, and other facets of writing for publication have been helpful. One needs to be reminded of improper use of words such as those ending in forms of "ology" in order to correct bad habits.

Littermates!

THE LARGER PIG received 2 cc. Ferrextran 52 days before this photograph was taken. It gained 60% more than the untreated control.

Unretouched photograph

Prevent iron-deficiency anemia for faster growth, lower mortality

Ferrextran T.M.

ADVANTAGES

Prompt utilization.

Sustained utilization (over 14 days).

Complete utilization (approaches 100%).

Single injection.

Individual, yet simple, administration.

Optimum weight-gains during nursing period.

Healthier pigs, less susceptible to secondary infections, pneumonias, enteritis, vaccination-induced shock.

20% reduction in mortality over oral-iron-treated controls.

Less toxic than oral or former injectable iron preparations.

FORT DODGE'S NEW INJECTABLE IRON-DEXTRAN COMPLEX

Each cc. of Ferrextran contains 50 mg. elemental iron, as ferric hydroxide, in complex with low molecular-weight dextran. Utilization of the iron approaches 100%, as compared with less than 5% of that in oral iron preparations. Controlled experimental studies in suckling pigs indicate that one dose (2 cc.) of Ferrextran results in a substantially greater hemoglobin response than three weekly oral iron treatments. Ferrextran is for intramuscular injection in baby pigs 3 to 7 days of age. *In packages 12/30-dose vials.*

FORT DODGE

FORT DODGE LABORATORIES, INC.,
FORT DODGE, IOWA

small animal biologicals that you can depend on . . .

FROMM

Vaccines and serums bearing the name FROMM are produced under the most rigid standards by specialists in small animal diseases. The quality of each vaccine and serum must exceed every test for purity, potency and safety. Produced in a laboratory dedicated to small animal research, FROMM vaccines and serums meet the specific needs of these animals.

FROMM biologicals are sold to graduate veterinarians only.

FREE ON REQUEST. How is your supply of "Life with Rover" booklets? Dog owners enjoy being given this entertaining and informative 8-page booklet on the ancestry, diet and health-care of dogs. Ask your local distributor.

FROMM
Laboratories, Inc.
GRAFTON, WISCONSIN, U.S.A.

NOW—an instant dry dog food that cuts mixing time in half!

The instant you add water, new QUICK KEN-L-MEAL turns into a crumbly-moist hamburger-like mix that smells meaty, tastes meaty, and nourishes better than meat alone!

ORDINARY MEAL. *As liquid is added, it forms unabsorbed "puddles" on surface.*

QUICK KEN-L-MEAL. *Liquid is absorbed almost instantly as added; no wasted time!*

This is the new meal discovery that has *everything* professionals have wanted for years!

Saves time—cuts mixing time in half. Then it *stays* crumbly-moist—won't pack down or cake in the feeding dish. So it saves clean-up time, too!

Dogs love it—they can't resist its meaty aroma and flavor. That's because it's rich in *real meat meal.*

Nourishes completely. Actually gives your dog *more* nourishment than fresh lean meat alone. Made from real meat meal, and other valuable ingredients—contains all the nutrients dogs are known to need.

Pasteurized for digestibility . . . and homogenized so that *every* golden-brown nugget tastes so good even a finicky eater cleans the bowl.

In convenient, economical 25- and 50-lb. bags at food, feed, and pet stores everywhere.

NEW! **Sends out strong "meat signals" dogs can't resist—*the instant you add water!***

on the hook or in the display case...

No Downgrading

Two naturally occurring hormones give your clients higher weight gains at lower cost per lb. of gain without risk of loss of grade.

SYNOVEX IS THE ONLY STEER FINISHING IMPLANT available today which contains two naturally occurring hormones, progesterone and estradiol benzoate. These are the hormones which make possible up to ½ lb. extra gain per head per day without risk of downgrading – on the hoof, on the hook or in the display case. *In fact, research has demonstrated that Synovex-implanted steers show finer finish, better bloom, and dress out with a higher percentage of lean and less separable fat.*

PHOTOGRAPHS PROVE QUALITY. The unretouched photographs on the opposite page show (1) carcasses and one rib section from Synovex-implanted steers, (2) carcasses and one rib section from unimplanted controls. Both groups were finished on the identical ration for the same period of time.

FLESH WELL MARBLED

Note excellent carcass conformation, excellent quality, texture and marbling of meat.

COOLER SHRINK IS NORMAL

Synovex does not cause excessive moisture retention in tissues; weight loss during cooking is normal.

EXCELLENT COLOR

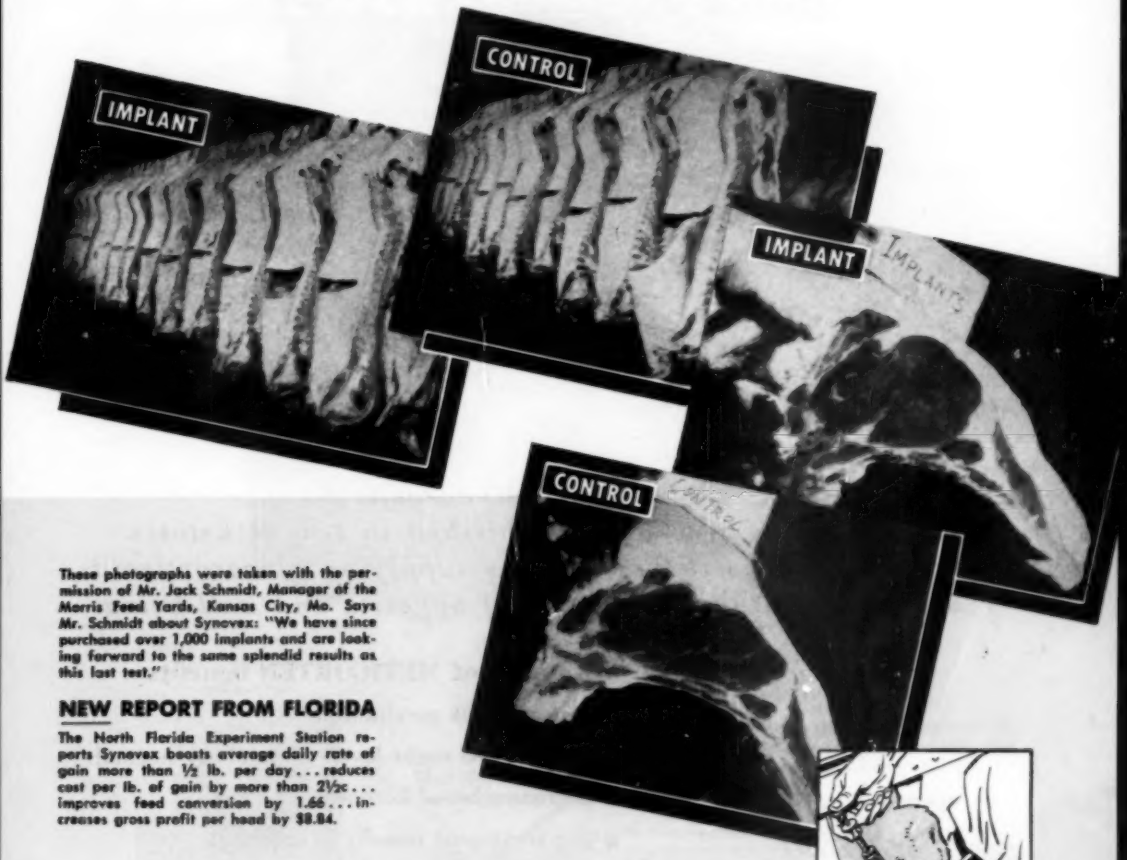
If photographs were in full, natural color, you would observe that meat in both sets is a prime, rich bright red.

SYNOVEX SAVES UP TO 5c PER LB. OF GAIN

Synovex goes to work in minutes after implant is made. Absorbed into the bloodstream, the two hormones are carried to every part of the steer's body and accelerate the enzyme activity in every cell. The result is a marked increase in appetite after only seven days which is then maintained all during feeding period. Increased rate of gain is measurable after 30 days. Feed conversion is improved as much as 20% over controls. Tests have proved that Synovex increased rate of gain up to 50% over Stilbestrol.

with SYNOVEX®

STEER FINISHING IMPLANTS



These photographs were taken with the permission of Mr. Jack Schmidt, Manager of the Morris Feed Yards, Kansas City, Mo. Says Mr. Schmidt about Synovex: "We have since purchased over 1,000 implants and are looking forward to the same splendid results as this last test."

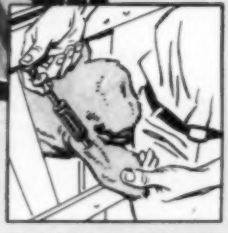
NEW REPORT FROM FLORIDA

The North Florida Experiment Station reports Synovex boosts average daily rate of gain more than ½ lb. per day . . . reduces cost per lb. of gain by more than 2½c . . . improves feed conversion by 1.66 . . . increases gross profit per head by $8.84.

SYNOVEX IS QUICK, EASY TO USE

Make slit with special scalpel between skin and cartilage of ear, insert implanter, press plunger to eject all six pellets of Synovex. One implant lasts a full 150 feeding days. Synovex is recommended for steers weighing from 400 to 1,000 pounds.

Synovex has been cooperatively developed by E. R. Squibb & Sons and Syntex. Synovex is a registered Squibb trademark.



SYNOVEX IS AVAILABLE FROM YOUR SQUIBB BRANCH OR YOUR WHOLESALER IN 10-IMPLANT AND 100-IMPLANT PACKAGES FOR YOUR USE AND DISPENSING.

For additional information, write
SQUIBB, *Veterinary Department*
745 Fifth Avenue, New York 22, N. Y.

SQUIBB QUALITY—THE PRICELESS INGREDIENT

in ketosis
one treatment

METICORTEN

gets results

The therapeutic value of the adrenocortical hormones has been well established in bovine ketosis. These agents act as replacement by supplying glucocorticoids, with a resulting stimulation of appetite and well-being.

Summary of METICORTEN benefits

- restores milk production
- raises blood sugar levels to or above normal
- decreases blood ketones
- one treatment usually is sufficient

Favorable therapeutic results also have been reported in horses and dogs following use of METICORTEN in skin and ocular conditions, inflammations and arthritis.

convenient dosage forms insure ease of administration

METICORTEN Aqueous Suspension, 10 mg./cc., 10 cc. vial, boxes of 1, 6, 72.

METICORTEN Aqueous Suspension, 40 mg./cc., 5 cc. vial, boxes of 1, 6, 72.

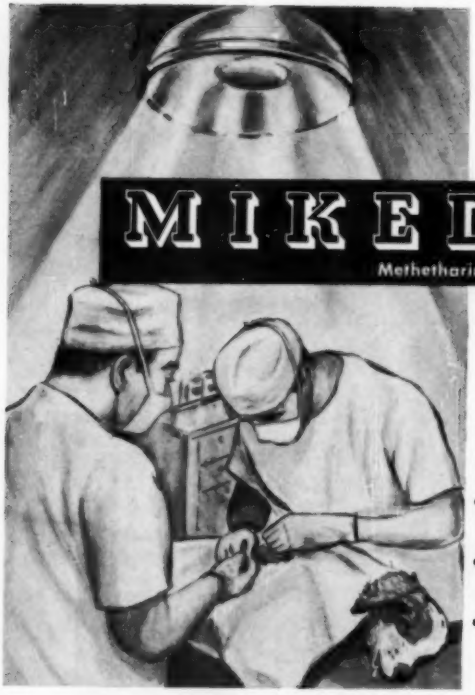
METICORTEN Tablets, 2.5 and 5 mg., bottles of 30 and 100.

METICORTEN,® brand of prednisone.

Schering

Schering Corporation
Bloomfield, New Jersey

V-MC-J-157



FOR BETTER MANAGEMENT OF BARBITURATE ANESTHESIA

MIKEDIMIDE*

Methetharimide, PARLAM TRADEMARK

THE BARBITURATE ANTAGONIST OF CHOICE

...INCREASES RESPIRATION

...RESTORES REFLEXES

...SHORTENS SLEEPING TIME

MIKEDIMIDE *is indicated*

- As a STRONG RESPIRATORY STIMULANT in the presence of barbiturates.
- As a STRONG CIRCULATORY STIMULANT in the presence of barbiturates.
- To QUICKLY AMBULATE the animal after surgery.
- To SHORTEN SLEEPING TIME under anesthesia.
- For ROUTINE ANTAGONISM THERAPY against barbiturate anesthesia.
- For EMERGENCY TREATMENT for barbiturate overdose and respiratory depression.
- To ACHIEVE A "SAFE PLANE" of anesthesia during and after prolonged surgery.

MIKEDIMIDE

MIKEDIMIDE has a high therapeutic index, and no signs of toxicity have been observed. Animals can be put to sleep or awakened almost at will, by the alternate use of barbiturate and MIKEDIMIDE without apparent harm to the animal.

MIKEDIMIDE is supplied in 10 ml., 60 ml. and 120 ml. multiple dose vials for parenteral use.

Literature available on request.

TARGET POINT CHEMOTHERAPY

Parlam CORPORATION ● 340 Canal Street New York 13, N.Y.

*Patent applied for.

SOLE CANADIAN DISTRIBUTOR: Veterinary Medical Supply Co. of Canada, 6579 Somerled Ave., Montreal, Que.

"Pioneer in veterinary medicine for target point chemotherapy"

WITH **pHisoHex**®

ANTISEPTIC DETERGENT

In the treatment of nonspecific and bacterial dermatoses and even parasitic diseases, it is important that the cat or dog be bathed with a gentle nonirritating antiseptic detergent. In addition to its safe, gentle and effective detergency, pHisoHex leaves a residual bacteriostatic film on the skin.

PRICES ON REQUEST

pHisoHex, trademark reg. U.S. Pat. Off.

Winthrop LABORATORIES
NEW YORK 18, N. Y.

AVMA Report

Tape Recordings—A Practical Means of Communication

Oliver D. Grace, D.V.M.
College of Agriculture, University of Nebraska, Lincoln

Presented at the AVMA Public Relations Conference, Cleveland, Aug. 18, 1957

Early in 1956, staff members of the Department of Animal Pathology and Hygiene at the University of Nebraska were discussing the desirability and the need of establishing some form of regular communication with the veterinarians of our state. Neither the university nor the Nebraska State Veterinary Medical Association had at that time a regular means of distributing information to the veterinary profession. A new position had just been established in the department in cooperation with the extension service—that of extension animal hygienist. It was suggested that the new communication program be incorporated as a part of the extension activity.

A Printed Medium Considered

A regular newsletter or possibly a more extensive publication was given rather thorough consideration. Enthusiasm for a printed means of communication was tempered by the realization that competition was extremely keen for our practitioners' reading time. Because of this competition, a publication from our organization would have to be unusually outstanding both in content and presentation in order to secure acceptance by our busy veterinarians. Such standards would be difficult to reach and maintain, especially with a limited budget and inexperienced personnel. This line of reasoning was further influenced by the belief that our veterinarians regularly receive a great quantity of varied printed material. Included in their mail are professional journals, house organs, informational literature on professional developments, farm papers, and magazines of a less technical nature. The increasing demands for veterinary service by necessity limits the time a veterinarian has for reading.

Tape Recordings Suggested

About this time, Dr. A. B. Hoerlein suggested that tape recordings might be useful in our communications program. He pointed out that tape recordings on professional subjects were being distributed nationally to many physicians. This service is designed to permit a physician to utilize the time involved while performing routine activities, such as driving his car on calls, or while relaxing after a heavy day of work. We felt that veterinarians had a similar time situation which might be utilized.

An investigation of the expense involved to establish such a tape-recording program was made. Plastic tapes purchased by our institution cost approximately $1.35. This is relatively inexpensive, considering the fact the tape can be used repeatedly and has a long life. Distributions by fourth class mail would keep expense in this area low. Machines for recording the material and playing the finished tape would be the only major expense. Tape recorders are available at many price levels. Machines used to make recordings need to be of somewhat better quality and therefore are higher priced than those employed to play tape recordings. A converter or inverter would be necessary to permit the use of a playback machine in a car. These can vary in price from about $30 upward, depending on quality and size.

Sources of material for recording purposes were another consideration. Possibilities considered were: tape recordings of papers at meetings; specially arranged presentations; interviews with visitors to the campus; abstracts from journal articles; and reviews compiled from various sources and related fields. Some of these seem to present greater opportunities for use than others.

Appraisal of the many factors involved resulted in a decision to begin the project

We believe...

• • • That the future of the livestock industry depends on a strong and thriving veterinary profession.

• • • That direct selling of veterinary products for the control of livestock diseases to laymen weakens both the veterinary profession and the livestock industry.

• • • That the best product cannot do the job right unless the disease is correctly diagnosed and the proper treatment is given.

• • • That our success depends on products of merit, on understanding livestock disease problems and on improved service to veterinarians.

• • • That promotion of products for the control of livestock diseases should be confined exclusively to the veterinary profession.

• • • That your growing acceptance of our products indicates agreement with our maxim—"Produced for and sold to graduate veterinarians only."

Affiliated is an independent, exclusive producer of veterinary biologics. We depend entirely on the veterinary profession for our existence. To justify this existence, we accept fully the responsibility to help meet the exacting demands of the profession for better biological products.

Affiliated BRAND

AFFILIATED LABORATORIES CORPORATION

The National Laboratories Corp.
The Gregory Laboratory, Inc.
Grain Belt Supply Co.
Corn Belt Laboratories, Inc.

Produced for and sold to Graduate Veterinarians only

on a trial basis. Two recorders and two converters were purchased. In addition, the recording facilities of our Agricultural Information Service were made available to us for the production of new recordings and duplication of tapes.

During the period between approval of the project by our administrators and arrival of the new equipment, a few recordings were made using borrowed equipment. These featured visitors to the campus and members of the department staff.

To evaluate the project, these early tape recordings and the new recorders were loaned to selected veterinarians. These men were requested to comment and criticize the subject matter, method of presentation, and the project itself. Their suggestions for additional subject matter and means of improving and expanding the project were solicited.

It was not until we had made several recordings that the flexibility of a tape recording program was fully realized. Tape recordings can be easily edited by simply erasing and re-recording short sections or, if long sections of a tape need to be deleted, cutting and splicing do the job. If a speaker is not satisfied with his finished recording it is very easy to erase and begin again.

Flexibility extends to the speaker by assisting him in getting his points across. He is able to put emphasis on certain key words and, by his voice, may project his personality into the presence of the listener. Such personality projection is not possible in our present-day style of scientific writing. This personal touch can certainly be good for the morale of the veterinarian located far from a college of veterinary medicine.

Flexibility extends to the listener as he can obtain a repeat performance by simply replaying the recording. This has additional value where fine points are being made by the speaker, or if some interruption occurs during the listening period.

Length is another flexible feature of tape recordings. Most of our recordings have been about 15-minutes duration and were recorded at a speed of 7½ inches per second. At this speed, a 5-inch reel containing approximately 600 feet of tape is adequate. Longer recordings can be secured by using a standard 7-inch reel, holding about 1,200 feet of plastic tape. The larger reel is used for 30-minute recordings. Either of the two standard reels can be doubled in time by reducing the speed of recording to 3¾ inches per second. The slower speed will probably reduce the quality of the recording.

Questionnaire and Response

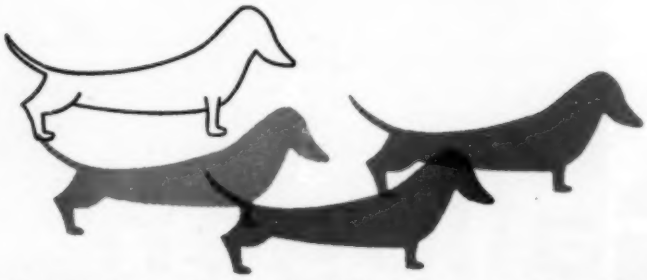
The enthusiasm with which our first recordings were received stimulated our efforts and the program began to receive some oral publicity. In June of this year, we felt the program was ready to be presented on a wider scale within the state. This introduction was accomplished by a letter and a questionnaire directed to the veterinarians licensed to practice in Nebraska. It was not intended that this material cross the state boundaries. However, some went as far west as California and as far east as New Jersey.

The questionnaire contained 13 questions constructed so that in most instances a check mark was sufficient to indicate an answer. Question one asked if the individual owned or had access to a tape recorder. About one third of those replied in the affirmative and desired an opportunity to use our tape recordings. All but three of the remaining two thirds wished to borrow a university machine and try the service. A few indicated an intent to buy recorders if we would assure them of a continuous tape supply.

Other questions were in regard to preferred length of recording, the type of material desired, method of presentation, and topics for new recordings.

Most veterinarians felt that a list of available subjects permitting selection of tapes would be more desirable than a regular circulation of new recordings after they were made. Each veterinarian was asked to indicate the portion of his practice devoted to large animals, small animals, and other activities. As would be expected, large animal practices predominate, with 53 per cent of our cooperators spending 90 per cent or more of their time in this area. The rest divided their time among small animals, poultry, meat inspection, disease control, and research.

Our objective in the communication program is to bring more information to the practitioners. We plan to survey foreign journals and journals in other scientific fields for pertinent material. To avoid repetition, we needed to know which and how



thousands of clinical cases prove that...

KOAGAMIN®

parenteral hemostat

arrests bleeding in minutes
prevents excessive blood loss

A Few Cases From The Literature[1]

CASE	DOSAGE OF KOAGAMIN	RESPONSE
Fox Terrier mammary tumor	1 cc. I.M., ½ hour preoperatively	"...capillary hemorrhage decreased to negligible...."
English Thoroughbred excise lachrymal duct	20 cc. I.V., at close of surgery	"...in 10 minutes bleeding had come to a practical stop...."
German Shepherd penal sarcoma	hemorrhage 5 hours postoperatively—3 cc. I.V.	"Bleeding lessened in 10 minutes...ceased in 20 minutes."
*Thoroughbred Gelding** amputate scirrhous cord	bleeding despite ligatures—10 cc. I.V., 10 cc. I.M.	"Seeping hemorrhage was arrested in 10 to 15 minutes."
Terrier panhysterectomy	Profuse bleeding during surgery—2 cc. I.M.; 2 cc. I.V., 10 minutes later	"...marked reduction in hemorrhage within 4 minutes... hemostasis in 10 minutes."

*N.B. A second thoroughbred under identical conditions but without KOAGAMIN: postoperative seeping hemorrhage—½ hour; oozing—an additional 2 hours.

KOAGAMIN, an aqueous solution of oxalic and malonic acids for parenteral use, is supplied in 20-cc. diaphragm-stoppered vials.

1. Rachman, M., and Frucht, T. R.: Vet. Med. *49*:341, 1954.

Chatham

CHATHAM PHARMACEUTICALS, INC • NEWARK 2, NEW JERSEY

Distributed in Canada by Austin Laboratories, Limited, Guelph, Ontario

07656

Gallogen®

SAFE

INJECTABLE LAXATIVE

Gallogen* acts promptly and directly on the hepatic cells to stimulate production of true whole bile. It has a secondary action stimulating emptying of gall bladder.

Gallogen* is safe to use in the recommended doses; no toxic effects have been noted.

Supplied: 30-cc. multidose vials, each cc. containing 50 mg. of Gallogen.*

Dosage: Intramuscular or intravenous administration. Cattle—500 mg. (10 cc.) Sheep and Swine—200 mg. (4 cc.) Dogs and Cats—50 mg. to 100 mg. (1 cc. to 2 cc.)

(*Diethanolamine salt of paratolylmethylcarbinol camphoric acid ester.)

VETERINARY DIVISION
THE S. E. MASSENGILL COMPANY
BRISTOL, TENNESSEE

many veterinary journals were received by our practitioner. Over 64 per cent receive three or more professional journals.

To determine the accuracy of our belief that veterinarians receive large quantities of literature, we requested an estimate of the number of pieces of professional literature which reached their desks in an average week. The numbers varied from three or four to 50 or 100. One man estimated his volume by saying, "Hard to estimate—two baskets full per week on average." Another replied, "Too much—nine tenths of which is junk," and a third simply replied, "Some never get to the desk."

The critical point in the questionnaire was reached at the end. The last two questions were: "Do you believe that the tape recording project is worthwhile?" and, "Would you prefer a monthly letter containing scientific material?" Sixty-four believed the tape recordings would be worthwhile, two said "No," and four were undecided. Forty indicated a desire for a monthly newsletter; however, 27 of these wanted both the recordings and the letter. This leaves only 13 men who definitely prefer the written over the spoken word. Twenty-two gave an emphatic "No" to the suggestion of a newsletter.

Perhaps those that replied to our letter do not represent a true cross section of the profession in Nebraska; however, of about 340 questionnaires sent out, only 75 were completed and returned. Presumably, most of the rest were discarded without being opened or a reply considered. Would not a newsletter or other printed publication receive similar treatment?

The tape recording service available to the physician which was mentioned earlier was described in the Dec. 27, 1956 issue of the *Wall Street Journal* and condensed in the April, 1957, issue of *Readers Digest*. The popularity of this service is evinced by its growth from an income of about $5,000 in 1952 to $750,000 in 1956. Not all of this income is derived from subscriptions as part of it comes from the sale of equipment. Plans are being made by the producers for further expansion to additional speciality fields and foreign language recordings.

Veterinary medicine is continually becoming more complex. To improve his professional service and conserve his time, the practitioner secures expensive electronic equipment including two-way radio and x ray. Great quantities of information are printed on the many aspects of the profession. Much of this printed material is not read, because the increasing demand for veterinary service reduces the time each veterinarian has for professional improvement. Therefore, modern veterinary practice pressure calls for a modern practical means of communication. Such a means is available in the form of concise, audible reports by the use of tape recordings.

AVMA Research Fellowships Available

The Research Council of the AVMA announces the availability of a number of fellowships for postgraduate training for the academic year, 1958-1959.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research may apply for a fellowship.

The latest date for filing the completed application is Feb. 15, 1958. Approximately one month is required for processing completed applications after receipt by the secretary of the Council. Qualified persons should secure and submit applications as early as possible to insure their file being complete for presentation to the Committee on Fellowships.

The Committee on Fellowships of the Research Council will meet in March to consider applications, and the awards will be announced soon afterward. The stipend will be determined in each case by the needs of the individual, the location of the school in which he proposes to work, and other factors. In general, the stipends range from $100 monthly and upward.

Any qualified person interested in graduate training may obtain application blanks and other information by writing to Dr. C. H. Cunningham, secretary, AVMA Research Council, Department of Microbiology and Public Health, College of Veterinary Medicine, Michigan State University, East Lansing, Mich.

new "far superior" treatment for retained placenta

Therapeutic failure, frequently encountered in retained placenta, can be prevented—with new FUREA Veterinary which combines the potent wide-range bactericidal and deodorizing action of FURACIN* (brand of nitrofurazone) with the cleansing action of urea. FUREA Veterinary boluses disintegrate readily and are nonirritating and nontoxic.

In retained placenta, treatment with FUREA has produced quick improvement of the general condition of the cow with lessening or elimination of malodor. Fertility rate remained unimpaired in over 90% of treated cows.*

SUPPLIED: Each bolus contains 0.12 grams of FURACIN and 12 grams urea. Bottle of 25.

DOSE: Two boluses inserted into the recently pregnant horn. One bolus may be placed in the non-pregnant horn.

*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

For vaginal infections, including those caused by Vibrio fetus, that may prevent conception, or cause abortion, dispense: FURACIN Suppositories Veterinary, large. Box of 12.

FUREA™
VETERINARY

AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

equipment news for the practicing veterinarian

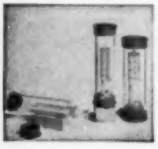
NICHOLSON

NEW! the improved Frank's Fetal Extractor

Nicholson now brings you the improved Frank's Fetal Extractor. Proved in thousands of cases, this instrument deftly assists with an infinite amount of pull on the newborn Makes difficult OB cases almost simple. Assembles in a minute, completely portable. Write for folder N-F.

NEW! Copon kennel paint refinishes rusty kennels

This new special plastic paint was developed for refinishing metal kennels. Gives hard, baked-enamel-like surface without baking. Makes your old rusty kennels like new. Works wonders on wood and concrete too. Can be brushed, rolled, or sprayed. Choice of colors. Write for folder N-C.



NEW! clear plastic cases for your glass syringes

Keep syringes sterile, clean in these light unbreakable plastic cases. Covers for 5, 10 and 20 cc. syringes.

NEW! plastic sign letters for your office

Our new selection of beautiful weatherproof plastic signs will dress-up your office or clinic. All sizes, colors; easily installed. Write for folder N-5. We ship them ready to install with simple tools.

NEW! do-it-yourself Plasti-Plated cages

Before you buy cages, write for folder N-2 on our amazing new Plasti-Plated kennels. Rock-hard, glass-smooth, seamless surfaces. Inexpensive, easy to do-it-yourself! We supply materials and complete instructions. Will furnish complete kennels if you prefer.

NEW! radiant heated warming panel

This electrically operated radiant heat panel eliminates messy boxes and blankets, hot pads, etc., when keeping weanlings warm, treating patients in shock. Heavily Plasti-Plated to resist stains, urine, etc. Shock-proof. 2 convenient sizes. Uses 110 v. current. Write for folder N-R.

durable, metal sheathed instrument/serum cases

Baked black enamel over steel with brass trim. 5 standard models; light weight yet built to take knocks! See folder N-1 for sizes, prices. Most are in stock, ready to ship.

hi-current electric firing iron

Most modern, up-to-date way to fire horses, remove warty growths, ear polypi, tumors. Complete with 11 points/tips. Operates on 110 v. barn current. A superb instrument for horse practice. Write for folder N-6.

electric "B" dairy cow branding iron

Heats in 90 seconds, makes a clean brand, weighs only 11 ounces. T and V brands available too. Uses 110 v. current, won't smoke. Write for folder N-3.

Please send me the folders I've checked below.

- ☐ folder N-1 cases
- ☐ folder N-2 Plasti-Plate
- ☐ folder N-3 "B" irons
- ☐ folder N-4 syringe cases
- ☐ folder N-5 sign letters
- ☐ folder N-6 firing irons
- ☐ folder N-F extractor
- ☐ folder N-R radiant panel
- ☐ folder N-C COPON paint

DVM _____

street _____

city _____

Nicholson Manufacturing Inc.
2440 East Third Avenue Denver 6

clip and mail today

. . . for shortened therapy and more speedy recovery in most febrile conditions

METICILLIN

METIcorten + penICILLIN

aqueous suspension

VETERINARY

reduces treatment time – The METICORTEN subdues inflammation and suppresses symptoms of toxicity, thus assuring more rapid action and shortened convalescence, METICILLIN thus combats stress and simultaneously checks bacterial infection.

single injection convenience – Where two separate injections previously were necessary to treat various conditions complicated by stress, METICILLIN alone may be used effectively. Smaller doses of both drugs may be used than when administered separately because the corticoid-antibiotic combination appears to exert a potentiating effect.

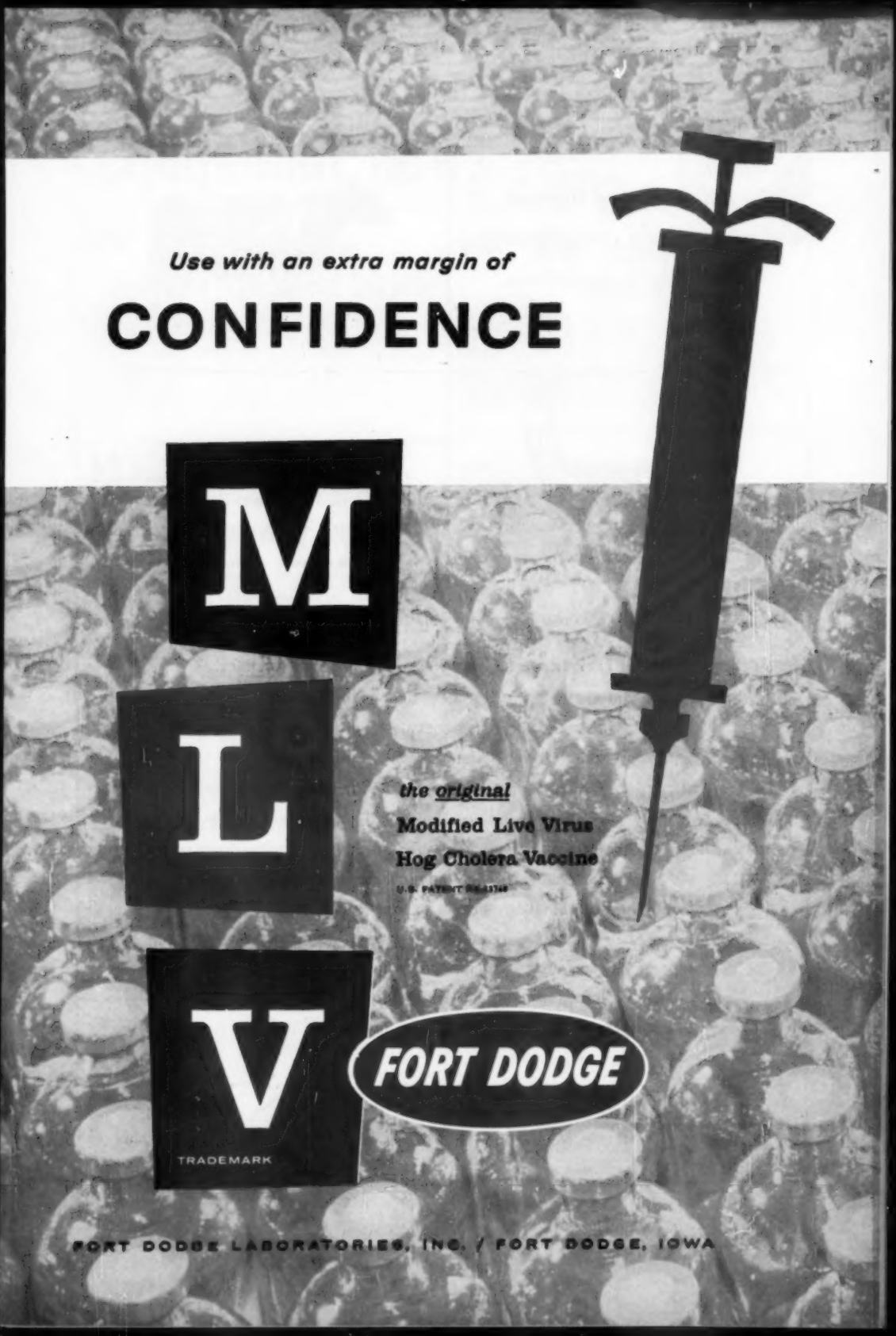
indicated in pulmonary conditions–foot rot–accident cases–pre- and postoperatively in various surgical procedures–as supportive therapy in bacterial infections complicated by stress.

packaging: METICILLIN Aqueous Suspension Veterinary, 10 cc. vial, boxes of 1, 6, 72.

METICORTEN,® brand of prednisone.
METICILLIN,® brand of procaine penicillin for aqueous injection with prednisone.
®T.M. V-MN-J-3107

Schering

SCHERING CORPORATION • BLOOMFIELD, NEW JERSEY


Use with an extra margin of
CONFIDENCE
M
L
V
TRADEMARK
the original
Modified Live Virus
Hog Cholera Vaccine
U.S. PATENT
FORT DODGE
FORT DODGE LABORATORIES, INC. / FORT DODGE, IOWA

JOURNAL
of the American Veterinary Medical Association
Established January, 1877 Chicago 5, Illinois
Vol. 132 January 1, 1958 No. 1

Infectious Canine Hepatitis

JAMES H. GILLESPIE, V.M.D.
Ithaca, New York

A SUMMARY of the information on infectious canine hepatitis which was then available was presented in a symposium at the 1952 AVMA meeting.[1] At that symposium, clinical features,[6] pathology,[13] epizootiology,[10] and immunology[12] were given. A review of the literature shows that little has been added since that symposium except to resolve the immunological paradox, reported at that time, that the dual vaccination procedure for canine distemper (CD) and infectious canine hepatitis (ICH), while providing excellent immunity, nevertheless acted to spread disease by establishing a carrier state with the virulent ICH virus used. Resolving this paradox has been the chief intent of recent workers, and the progress made along these lines is the basis for this paper.

In the 1952 symposium, the successful simultaneous immunization of dogs against CD and ICH, using the two vaccines with serum, was reported.[8] The idea of a combined immunization procedure for these two diseases naturally followed the finding that both could infect simultaneously. This vaccination procedure caused no signs of illness, yet produced active immunity against both diseases. The distemper component was not transmitted to other dogs, but the ICH virus persisted in the kidneys of some vaccinated dogs and, in some tests, was transferred to other dogs placed in contact exposure.

This vaccine, over a period of four years, always protected dogs against ICH in laboratory tests and in field tests made on a large number of dogs in kennels in various parts of the United States. However, this was not the case with the CD component of the vaccine in the early trials. On three occasions, 1 to 4 dogs in a kennel showed signs of illness which proved to be CD infection.

Subsequent studies on immunity to distemper in dogs have shown that egg strain vaccines differ in their ability to immunize.[2] For example, it may require much more virus to immunize with a strain that has had many serial transfers in eggs than with a strain that has had only a few transfers. In our earlier vaccines, we used a strain having more than 200 transfers and, even when virus was present, some experimental pups did not become immune. After changing to a strain with less than 50 serial transfers in eggs, the immune response was consistently good.

We also know now that maternal immunity interferes with production of active immunity in young pups.[7,11] In our earlier tests, we vaccinated with dual vaccine when pups were 6 weeks of age. The failures probably were due to no immunity resulting from the initial vaccination and the pups then became infected with distemper virus before they were immunized by the vaccination when 3 months old.

Although the dual vaccine produced good immunity to ICH, it was felt that an improvement would be made by use of an attenuated ICH component. However, attempts to propagate the virus of ICH in an alien host were not successful. Recently, the propagation of this virus in tissue-cultured dog kidney cells was reported.[3,5] The virus produced a cytopathogenic effect in epithelium cells which could be readily seen with a microscope. After 51 transfers in tissue-cultured dog kidney cells, the virus became modified for dogs.[5] Most dogs that were inoculated showed no signs of illness. Later, it was reported[4] that the

From the Veterinary Virus Research Institute, New York State Veterinary College, Cornell University, Ithaca.

modified virus retained its renal tropism, continued to be excreted in the urine, and was transferred to dogs exposed by contact. Dogs infected by contact exposure, however, showed no signs of illness and

TABLE 1—Tests for Effectiveness and Safety of a Combined Vaccine Given Simultaneously for Protection of Dogs Against Canine Distemper (CD) and Infectious Canine Hepatitis (ICH)

No. of dogs*	Clinical response to vaccine**			Immunity†	
	Temp.	Leuk.	Other	CD	ICH
14 (vaccinated)	0/14	0/14	0/14	14/14	14/14
10 (unvaccinated)	0/10	0/10	0/10	0/10	0/10

*Six litters of puppies were placed in isolation units and approximately half of each litter were vaccinated; the remaining were left unvaccinated.

**Vaccine used represented CD virus cultivated in eggs (45th passage from ferrets) and ICH virus tissue cultured in swine kidney cells (15th passage after 54 tissue culture passages in dog kidneys); †immunity determined by serological response and signs of illness following inoculation in sequence of virulent ICH and CD viruses.

the virus required four serial passages to restore virulence. When attempts were made to propagate ICH virus in tissue-cultured swine kidney cells, the virus was maintained for seven transfers but was no longer present in the eighth passage.[5] No effects of the virus were shown by the cells in any tubes at any passage level. Subsequently, ICH virus was adapted to tissue-cultured swine kidney cells after 53 transfers in tissue-cultured dog kidney cells.[9] The virus grew well in swine cells and produced a cytopathogenic effect on the cells. Twenty transfers have been made thus far in cultures of this cell type. Recently, it was reported that ICH virus was passaged for 11 serial transfers in pig kidney cells.[14]

In line with our previous thinking of a better dual vaccine for ICH and CD, tenth passage tissue-cultured swine kidney ICH virus was combined with egg cultivated CD virus. The results of our studies to date with this improved vaccine in dogs are given (table 1). Our results clearly indicate that this vaccine does not cause signs of illness and gives rise to antibodies for both diseases. When inoculated one month later in sequence, first with virulent ICH and after two weeks with virulent CD virus, the dogs were completely protected against both diseases. These experiments indicate that a safe and effective vaccine has been evolved for CD and ICH. Field tests of more than 1,500 dogs vaccinated by veterinarians with the improved dual vaccine seem to be in accord with experimental results from a standpoint of safety and effectiveness. None of the vaccinated dogs have shown signs of illness after vaccination, and tests on some show good antibody response. Duration of immunity in dogs vaccinated under field conditions is under study now. This is a long term project and it is too early to report results.

SUMMARY

A dual vaccine of attenuated viruses of canine distemper and of infectious canine hepatitis did not cause any signs of illness and produced immunity in dogs against both diseases.

References

[1]Baker, J. A., Riser, W. H., Mark, J. H., Poppensiek, G. C., Stephenson, H. C., and Gillespie, J. H.: Symposium on Infectious Canine Hepatitis. Proc. Book AVMA (1952): 223.

[2]Burgher, Joan, Baker, J. A., and Gillespie, J. H.: Personal observations.

[3]Cabasso, V. J., Stebbins, M. R., Norton, T. W., and Cox, H. R.: Propagation of Infectious Canine Hepatitis Virus in Tissue Culture. Proc. Soc. Exptl. Biol. and Med., *85*, (1954): 239.

[4]Fieldsteel, A. H.: Some Aspects of Infectious Canine Hepatitis Virus in Tissue Culture. Am. J. Vet. Res., *17*, (1956): 380.

[5]Fieldsteel, A. H., and Emery, J. B.: Cultivation and Modification of Infectious Canine Hepatitis Virus in Roller Tube Cultures of Dog Kidney. Proc. Soc. Exptl. Biol. and Med., *86*, (1954): 819.

[6]Gillespie, J. H.: Symposium on Infectious Canine Hepatitis. Clinical Features of Infectious Canine Hepatitis. Proc. Book AVMA (1952): 224.

[7]Gillespie, J. H.: Immunity to Distemper in Dogs. 6th Gaines Veterinary Symposium (1956): 12.

[8]Gillespie, J. H., Robinson, J. I., and Baker, J. A.: Dual Infection of Dogs with Distemper Virus and Virus of Infectious Canine Hepatitis. Proc. Soc. Exptl. Biol. and Med., *81*, (1952): 461.

[9]Lee, K. M., Singh, C., Gillespie, J. H., Burgher, Joan, and Baker, J. A.: The Propagation and Modification of Infectious Canine Hepatitis Virus in Tissue-Cultured Swine Kidney Cells. Presented at N. Y. State Vet. Coll. Ann. Conf., January, 1957.

[10]Mark, J. H.: Symposium on Infectious Canine Hepatitis. Epizootiology of Infectious Canine Hepatitis. Proc. Book AVMA (1952): 226.

[11]Ott, R. L.: Concepts of Distemper Immunization. Proc. Am. Anim. Hosp. Assoc., 23rd Ann. Meet. (1956): 111.

[12]Poppensiek, G. C.: Symposium on Infectious Canine Hepatitis. Immunology of Infectious Canine Hepatitis. Proc. Book AVMA (1952): 228.

[13]Riser, W. H.: Symposium on Infectious Canine Hepatitis. Pathology of Infectious Canine Hepatitis. Proc. Book AVMA (1952): 225.

[14]Fieldsteel, A. H., and Yoshihara, G. M.: Propagation of Infectious Canine Hepatitis Virus in Cultures of Pig and Ferret Kidney. Proc. Soc. Exptl. Biol. and Med., *95*, (1957): 683.

Crossbred Steer Wins Carcass Contest.—For the first time at the International Livestock Exposition, Chicago, the dressed steer carcass contest was won by a crossbred, a Shorthorn-Angus, from Wisconsin. The steer had not placed when the group was judged on the hoof. It was the second time in 51 contests that an Aberdeen Angus had not won. This year, an Aberdeen Angus placed second. The grand champion steer was a summer yearling Hereford, reserve championship going to an Angus.—*Chicago Sun. Times, Dec. 4, 1957.*

Dairy Statistics.—In 1957, 23 million cows on 548,763 dairy farms in the United States (down 20% in 10 years), averaged 6,006 lb. of milk with a 3.84 per cent butterfat. Milking machines are used on 73.1 per cent of the dairy farms. Artificial insemination, started in 1939, was used on 27 per cent of the cows. Of the milk produced 5 per cent was exported. By 1975, it is estimated that we will need 30 per cent more milk.—*Hoard's Dairyman (Nov. 10, 1957): 1085.*

High Mountain Sickness of Cattle.—In the Rocky Mountain region, this disease causes the death of 0.5 to 1.0 per cent of the cattle which range above 7,000 ft. altitude. Affected animals develop edema (particularly of the brisket), diarrhea, and weakness. Of 111 cases studied, 78 per cent occurred at altitudes over 6,000 ft.; 62 per cent were fatal; and 77 per cent occurred in the five late fall and winter months when cold weather and associated pathological conditions in the lungs increase cardiac labor. It usually occurred after the cattle were brought down from higher altitudes.

Gross pathological changes were found in the heart, lungs, and liver. The heart was always hypertrophied and dilated on the right side, dilation of the right ventricle being accompanied by incomplete closure of the tricuspid valve. About half of the animals recover when transported to altitudes of less than 5,000 ft.—*R. Pierson in Rocky Mount. Vet. (Oct., 1957): 22.*

A fish-eating bat which obtains its food directly from the sea was found in the Gulf of California.—*Sci. News Letter (Nov. 16, 1957): 318.*

Farm Zoonoses and Accidents.—The farm may be the most healthful place to live, but not the safest. In 1955, of 14,200 occupational deaths in the United States, 26 per cent occurred among farmers (7% of working population). The on-the-job fatal accident rate was exceeded only in mining and construction. Accidents with tractors and with chemicals, such as insecticides, herbicides, and fertilizers, ranked high. Farmers are also frequently exposed to zoonotic diseases.

Iowa, with a population of 2.5 million persons and more than 50 million domestic animals, is the first state to have an Institute of Agricultural Medicine, including a public health veterinarian. State surveys show that of the 115 zoonotic diseases, approximately 40 occur in Iowa. Of 3,000 human blood samples submitted for other purposes, 2 per cent were Leptospira-positive. Q fever exists enzootically in certain dairy herds, 1.0 per cent of the cattle and 3.5 per cent of the herds showing infection; and, of 200 veterinary practitioners tested, 8.5 per cent were Q fever-positive. Several cases of psittacosis contracted from domestic fowl have been investigated. Toxoplasmosis is being investigated because of the high correlation between human toxoplasmin sensitivity and contact with animals. Of interest is the role of Toxoplasma in cases of degenerative retinitis in farmers.—*R. A. Tjalma, Conf. Pub. Health Veterinarians, State University of Iowa, Iowa City, Nov. 13, 1957.*

Experimental Hydrocephalus.—Hydrocephalus occurred in 242 of 303 baby rabbits when their mothers were deprived of vitamin A from several months before conception until weaning time. It was apparently due to overproduction of cerebrospinal fluid. When the hydrocephalic animals were given vitamin A orally, this fluid pressure returned to normal in three to four weeks.—*Vet. Bull. (Nov., 1957): Item 3464.*

Migration of Ascaris Larvae in Pigs.—In 34 baby pigs, almost all of the *Ascaris suum* larvae reached the liver by the fourth day, and the lungs by the ninth day of infection; they were found in the intestine on the eighth day. The larvae were 1.54 mm. in length on the eighth day, and 2.73 mm. on the fifteenth day.—*Vet. Bull. (Nov., 1957): Item 3338.*

Further Studies on the Whey Plate Test for Brucellosis

FRANK C. STILES, Jr., D.V.M.; MARTIN H. ROEPKE, Ph.D.; FRED C. DRIVER, D.V.M.; R. K. ANDERSON, D.V.M.

St. Paul, Minnesota

THIS PAPER is an amplification of the earlier study reported from this station, comparing the whey plate agglutination test for the diagnosis of bovine brucellosis with the standard sero-agglutination test.[3]

The earlier report cited the results of studies on the milk of 204 brucellosis-reactor cows from which milk and blood samples were obtained as the animals arrived at the stockyards in South St. Paul. As reported, 53 (26%) of 204 of these animals were classified as negative by the whey plate test[2] (incubated for 6 min.). Brucella organisms were cultured from the milk of 10 (19%) of 53 of the whey negative-blood reactor animals.

At the end of that study, it was considered a possibility that there might have been a certain number of animals in the herds from which the reactor animals came which were blood test negative-whey test positive. To evaluate this possibility, the present field study was set up to include a determination of the relative frequency in infected herds of such animals in comparison with their opposites, the blood test reactor-whey test negative animals.

To study these animals, it was decided to apply the whey test and blood test to all lactating animals in a number of herds containing: (1) blood test-reactor animals and (2) ring test suspicious-blood test negative or suspicious animals. It was hoped, in addition, to obtain suitable tissues as well as milk samples for culturing from a number of animals in which there was disagreement between the two tests.

MATERIALS AND METHODS

In order to obtain the largest possible number of recently infected, blood test negative-whey test positive cows, samples of milk and blood were taken from all (922) lactating cows in 51 herds with blood test reactors, since animals in this type of herd should have a high exposure potential. Sampled also, in the same manner, were all (367) lactating cows in 22 herds containing ring test suspicious-blood test negative or suspicious cows.

It was possible to obtain tissues for culturing (supramammary, iliac, lumbar, and retropharyngeal lymph node, udder, and spleen) from only 9 animals of the type desired (at meat packing plants in St. Paul and Austin, Minn., at the time of slaughter).

All of the herds sampled were located within a 50-mile radius of the local state-federal brucellosis laboratory, where the blood samples were processed.

The agglutination tests for the blood, milk, and whey were conducted in the same manner as in the previous study. In both studies, the whey plate tests were read after six and again after 14 minutes' incubation. The previous study was reported on the six-minute incubation period, whereas this study is being reported on the basis of the 14-minute incubation period. The milk plate test[1] was incubated for 14 minutes in both studies. The sero-agglutination test results were recorded as follows: Negative = no agglutination in the 0.04-ml. amount of serum (−−−); suspicious = any agglutination in the 0.04-ml. amount (I−− or +−−) to incomplete agglutination in the 0.02-ml. amount (+I−); reactor = complete agglutination in the 0.02-ml. amount (++−) and any agglutination in the 0.01-ml. amount (++I or +++). The milk and whey test reactions were determined as any agglutination in the least amount of milk or whey, *i.e.*, 0.08 ml. of milk or whey = 1+, 0.04 ml. = 2+, 0.02 ml. = 3+, 0.01 ml. = 4+, and 0.005 ml. = 5+. The recommendations for the interpretation of the whey test[2] (negative or 1+ reactions are negative, 2+ reactions are suspicious, and 3+ or higher reactions are positive) were followed.

The antigens used for the tests were furnished by the Agricultural Research Service, U.S.D.A.

Milk sediment and cream from those animals in which the blood and whey tests were not in agreement were cultured and inoculated into guinea pigs in the same manner as reported previously.[2] Lack of agreement between the tests was adjudged to be blood test reactor-whey test negative or blood test negative-whey test positive. There were 28 animals in these categories. Milk samples from 32 blood test negative or suspicious animals with whey reactions from negative to 5+ were cultured and inoculated into guinea pigs. In addition, milk

Paper No. 3840, scientific journal series, Agricultural Experiment Station, University of Minnesota, St. Paul.

Drs. Stiles and Driver are with the Animal Disease Eradication Division, Agricultural Research Service, U.S. D.A., St. Paul, Minn. Drs. Roepke and Anderson are in the Division of Veterinary Bacteriology and Public Health, College of Veterinary Medicine, University of Minnesota.

These studies were made possible, in part, by a grant from the Animal Disease and Parasite Research Division, Agricultural Research Service, U.S.D.A.

The authors thank Dr. A. W. Thomas who collected the samples, and the participating dairy farmers and meat packing plants in Minnesota for their cooperation in this study.

TABLE 1—Blood and Whey Reactions of 922 Cows in 51 Herds Containing Brucellosis Reactors

Serum plate test			Whey test reactions—No. of animals					
Titer*	No. of animals	%	Neg.	1+	2+	3+	4+	5+
− − −	762	83%	758	2	2	0	0	0
I − −	22	2%	21	0	1	0	0	0
+ − −	33	4%	29	0	1	0	2	1
+ I −	12	1%	9	0	2	1	0	0
+ + −	37	4%	18	2	6	4	2	3
+ + I	12	1%	1	0	1	6	3	1
+ + +	44	5%	4	1	3	7	5	24
Total	922		840	5	16	18	12	31
% of Total			91%	0.5%	1.7%	2.0%	1.3%	3.4%

*Dilutions equivalent to 1:50, 1:100, 1:200; − = no agglutination; I = incomplete agglutination; + = complete agglutination.

samples from 8 of 66 blood tests reactors with 2+ to 5+ whey test reactions were cultured and inoculated into guinea pigs. Of the remaining 58 blood test reactors, 43 were cultured on medium only.

TABLE 2—Blood and Whey Reactions of 367 Cows in 22 Herds Containing Ring Test Suspicious-Blood Nonreactor Cows

Serum plate test			Whey test reactions—No. of animals					
Titer*	No. of animals	%	Neg.	1+	2+	3+	4+	5+
− − −	351	96%	347	1	1	1	0	1
I − −	9	2.3%	4	1	0	3	1	0
+ − −	5	1.3%	1	0	1	2	1	0
+ I −	2	0.5%	1	0	0	0	1	0
Total	367		353	2	2	6	3	1
% of Total			96%	0.5%	0.5%	1.6%	0.8%	0.3%

*Dilutions equivalent to 1:50, 1:100, 1:200; − = no agglutination; I = incomplete agglutination; + = complete agglutination.

RESULTS

The distribution of the blood and whey reactions of the 1,289 animals tested in the 73 herds is shown (table 1 and 2).

Of the 93 blood test reactor cows found in the 51 herds, 26 were classified as negative (− or 1+), 10 as suspicious (2+), and 57 as positive (3+ to 5+) on the basis of the whey plate test results. The whey test classification for the 67 cows in the blood test suspicious range were 59 negative, 4 suspicious, and 4 positive. Only two suspicious and no positive whey test reactions were obtained on the 762 blood test negative animals in the 51 reactor herds (table 1).

Of the 367 lactating animals that were blood and whey tested in 22 herds with ring test suspicious-blood test negative or

TABLE 3—Summary of Blood and Whey Reactions on 1,289 Lactating Cows in 51 Herds Containing Reactors and 22 Herds Containing Ring Test Suspicious-Blood Nonreactor Cows

Serum plate test		Whey test classification—No. of animals		
Classification	Total animals (No. and %)	Negative (− or 1+)	Suspicious (2+)	Positive (3+ to 5+)
Negative (− − −)	1,113 86.0%	1,108 99.6%	3 0.27%	2 0.18%
Suspicious (I − − to + I −)	83 6.4%	66 80.5%	5 6.0%	12 14.5%
Reactor (+ + − to + + +)	93 7.2%	26 28.0%	10 11.0%	57 61.0%
Total	1,289	1,200 93.0%	18 1.4%	71 5.5%

TABLE 4—Distribution of Brucella Reactions and Isolation Studies on 17 Cows Vaccinated as Calves

Serum plate test		Whey test reactions—No. of animals					
Titer*	No. of animals	Neg.	1+	2+	3+	4+	5+
— — —	2	0	1	1	0	0	0
I — —	0	0	0	0	0	0	0
+ — —	2	1	0	0	1	0	0
+ I —	1	0	0	1	0	0	0
+ + —	5 (1)**	5 (1)	0	0	0	0	0
+ + I	0	0	0	0	0	0	0
+ + +	7 (5)	1	0	0	1 (1)	1 (1)	4 (3)
Total	17	7	1	2	2	1	4
Isolations	6	1	0	0	1	1	3

*Dilutions equivalent to 1:50, 1:100, 1:200; — = no agglutination; I = incomplete agglutination; + = complete agglutination; ** numbers in parentheses indicate number of Brucella isolations in that reaction category.

suspicious cows, 16 had blood test titers in the suspicious range, while the whey plate tests were suspicious on 2 and positive on 10. One cow with suspicious and 2 with positive whey test reactions were negative to the blood test (table 2).

A summary of the blood and whey tests in both types of herds is presented (table 3). The animals are classified on the basis of the results of both the blood test and the whey test.

Of particular interest is the number of blood test negative-whey test positive animals (2 cows) as compared with the number of blood test reactor-whey test negative animals (26 cows). Of the 1,289 animals tested, 93 had blood reactor titers and 83 had blood suspicious titers, as compared with 71 positive and 18 suspicious reactions to the whey test.

Varying degrees of blood or whey test reactions were obtained on 17 animals which were recorded on the field blood test charts as being calf vaccinated. The agglutination tests and Brucella isolation results on these animals are given (table 4).

The results were not markedly different from those for the nonvaccinated animals so the vaccinated animals were treated as being nonvaccinated in the remainder of the tables.

Of the 93 blood test reactors, 78 were studied bacteriologically. The results of these studies are summarized (table 5).

Both tissues and milk were cultured from 9 of the 26 animals in the blood test reactor-whey test negative group. Milk only was cultured from 17.

Brucella were isolated from 9 (35%) of the 26 blood test reactor-whey test negative animals; from milk of 5, from tissues of 3, and from milk and tissues of 1.

The various agglutination tests on the blood and milk and the isolation results for these 9 cows are summarized (table 6).

Of the 9 blood test reactor-whey test negative animals from which Brucella were isolated, 7 (78%) had blood titers of +1:100, 1 a titer of partial 1:200, and 1 above +1:200. The milk plate test reactions on quarter milk samples from which Brucella were isolated by direct culture of the cream were appreciably different from those found in the previous study. In this study, Brucella were isolated from four individual quarter milk samples with negative milk plate test reactions, whereas in the previous study no isolations were made from quarter milk samples with test reactions less than 3+.

Brucella organisms were isolated from the milk of 6 of the animals in this group, whereas isolations were made from the tissues of 4. The culturing of the tissues

TABLE 5—Brucella Isolation Studies on 78 Blood Test Reactor Animals

Serum plate test		Whey test reactions — No. of animals					
		Negative		Suspicious	Positive		
Titer*	No. of animals	Neg.	1+	2+	3+	4+	5+
++—	33	18	2	5	1	2	5
++I	7	1	0	1	4	1	0
+++	38	4	1	3	6	4	20
No. cultured		23	3	9	11	7	25
No. isolations		8	1	5	7	6	17
Isolations (%)		35%	33%	56%	64%	86%	68%
Isol. in neg. range (%)		35%					
Isol. in susp. range (%)				56%			
Isol. in pos. range (%)						70%	

*Dilutions equivalent to 1:50, 1:100, 1:200; — = no agglutination; I = incomplete agglutination; + = complete agglutination.

TABLE 6—Agglutination Tests on 9 Infected Whey Negative-Blood Reactor Cows

Cow No.	Serum plate titer[1]	Ring test titer[2]	Milk plate test					Whey plate test	Isolation			
			LF	LR	RF	RR	Comp.		Cream		Tissues	
									Direct	GP	Direct	GP
1	++−	−1	−−−−	−−−−*	−−−−*	−−−−	−−−−	−−−−	+	NC	0	0
6	++I	8	++−−	++−−	+−−−	++−−*	+−−−	−−−−	+	NC	0	0
7	++−	25	++−−	−−−−	−−−−	++−−*	−−−−	−−−−	+	NC	0	0
9	+400[3]	8	−−−−	−−−−	−−−−	−−−−	−−−−	−−−−	−	−	+	NC
11	++−	8	+−−−	+−−−	+−−−	−−−−	+−−−	−−−−	−	+	0	0
67[v]	++−	4	−−−−	−−−−	++−−	−−−−	−−−−	−−−−	−	+	+	NC
68	++−	−1	−−−−	−−−−	−−−−	−−−−	−−−−	−−−−	−	−	+	−
98	++−	2	−−−−	+−−−	−−−−	+−−−	−−−−	−−−−	−	−	+	−
108	++−	12	−−−−	++++−	−−−−*	−−−−*	+−−−	+−−−	+	NC	0	0

1 = Dilutions equivalent to 1:50, 1:100, 1:200; − = no agglutination; I = incomplete agglutination; + = complete agglutination; 2 = reciprocal of dilution in pooled negative milk; −1 = negative reaction in undiluted milk; *quarters from which Brucella isolations were made by direct culture; NC = guinea pigs inoculated but not cultured; O = inoculation not made; 3 = reciprocal of serum tube test titer; v = vaccinated as a calf (the animal had a +++ reaction on the field blood test).

as well as the milk from 9 (35%) of 26 of the animals in the blood test reactor-whey test negative category resulted in three more Brucella isolations, or an increase of 50 per cent (an increase from 6 to 9).

The tissues of the 4 cows from which isolations were made are as follows: cow 9—supramammary lymph node; cow 67—milk (via guinea pig inoculation), udder, supramammary, and pooled lumbar-iliac lymph nodes; cow 68—supramammary lymph node; cow 98—lumbar-iliac lymph nodes.

The results of the culture studies on the milk samples from 23 blood test negative or suspicious animals with 1+ to 5+ whey test reactions are summarized (tables, 7, 8).

One cow with a negative blood test and a 5+ whey test reaction was sold before aseptic milk samples for culturing could be obtained. Brucella organisms were isolated from the milk of 2 cows in each type of herd and only from cows with blood test titers in the suspicious range. Three of the isolations were from animals with positive (4+) whey test reactions and one from an animal with a suspicious (2+) whey test reaction.

TABLE 7—Brucella Isolation Studies on 11 Blood Negative or Suspicious Cows in Reactor Herds

Serum plate titer*	No. of animals	Whey test reactions — No. of animals				
		1+	2+	3+	4+	5+
−−−	3	1	2	0	0	0
I−−	1	0	1	0	0	0
+−−	4	0	1**	0	2**	1
+I−	3	0	2	1	0	0
No. Cultured	11	1	6	1	2	1
No. Isolations	2	0	1	0	1	0

*Dilutions equivalent to 1:50, 1:100, 1:200; − = no agglutination; I = incomplete agglutination; + = complete agglutination; **isolations made from animals with these reactions.

TABLE 8—Brucella Isolation Studies on 12 Blood Negative or Suspicious Cows in Nonreactor Herds That Were Suspicious to the Ring Test

Serum plate titer*	No. of animals	Whey test reactions — No. of animals				
		1+	2+	3+	4+	5+
−−−	2	0	1	1	0	0
I−−	5	1	0	3	1**	0
+−−	4	0	1	2	1	0
+I−	1	0	0	0	1**	0
No. cultured	12	1	2	6	3	0
No. isolations	2	0	0	0	2	0

*Dilutions equivalent to 1:50, 1:100, 1:200; − = no agglutination; I = incomplete agglutination; + = complete agglutination; ** animals from which isolations were made.

In addition to the culture studies on the above types of animals, milk samples from 9 (15%) of 59 cows with blood test suspicious-whey test negative reactions in reactor herds were cultured. No Brucella isolations were made.

To obtain additional information regarding possible infection in the animals in the blood test suspicious range, the results of the first blood retests were tabulated for as many of the animals as possible (table 9).

As shown in table 9, of the 43 blood test suspicious-whey test negative (− or 1+) animals, 6 were later (30 to 90 days) diagnosed as reactors on the basis of the first blood retest results. All 4 whey test suspicious or positive (2+ to 5+) animals were diagnosed later as negative to the blood test.

DISCUSSION

This study, more strongly than the one reported previously, indicates that the whey plate test is not satisfactory as an official diagnostic test for bovine brucellosis under the conditions present in Minnesota.

TABLE 9—First Retest Results of Blood Test Suspicious or Negative Animals (Whey Test Negative to 5+) in Reactor Herds

Original tests		Total No. of animals	First blood retest results		
Serum titers*	Whey reactions		Neg.	Susp.	Reactor
–––	1+	1	1	0	0
	2+	1	1	0	0
I––	–	13	8	5	0
+––	–	24	7	14	3
	4+	1	1	0	0
	5+	1	1	0	0
+I–	–	5	0	3	2
	1+	1	0	0	1
	2+	1	1	0	0
Total		48	20	22	6**

*Dilutions equivalent to 1:50, 1:100, 1:200; – = no agglutionation; I = incomplete agglutination; + = complete agglutination; ** reactor titers for these 6 animals are: 1 ++–, 2++ I, and 3 +++.

This conclusion is supported by the following facts: (1) Of the 93 blood test reactor cows involved in this study, 26 (28%) were classified as negative to the whey plate test; (2) Brucella organisms were isolated from 9 (35%) of the 26 whey test negative cows; (3) blood and whey plate tests on 1,289 cows in 51 blood test reactor herds and in 22 ring test suspicious herds, classified as negative or suspicious to the blood test, disclosed 26 blood test reactor cows that were negative to the whey test compared with 2 blood test negative cows that were positive (3+ or higher) to the whey test (tables 1 and 2).

Tissues from only a limited number of cows (9, 35%, of the 26 blood test reactor-whey test negative animals) were cultured; however, Brucella organisms were isolated from 3 more animals than would have been isolated by culturing only the milk samples. This indicates rather definitely that a critical evaluation of the whey plate test must include the culturing of various tissues of the animals in addition to milk. The culturing of the tissues in addition to the milk from 35 per cent of the 26 blood test reactor-whey test negative animals increased the number of isolations of Brucella by 50 per cent (9 as compared with 6).

There was an appreciable difference in the percentage of blood test reactor-whey test negative cows found in this study from that found in the previous study. When both sets of data were analyzed on the basis of the six-minute incubation period for the whey test, there were 26 per cent blood reactor-whey negative cows in the previous study with Brucella isolations from 19 per cent of these animals, compared with 38 per cent blood reactor-whey negative cows in this study and isolations from 37 per cent of these animals. When both sets of data were analyzed on the basis of the 14-minute incubation period for the whey test, there were 20 per cent blood reactor-whey negative cows in the previous study with Brucella isolations from 17 per cent of these animals, compared with 28 per cent blood reactor-whey negative cows in this study and isolations from 35 per cent of these animals. A possible reason for this difference is that a higher percentage of the blood test reactor animals involved in this study may have been in earlier stages of infection than those involved in the previous study. This is suggested by the high percentage of reactors with blood titers no higher than +100 found in this study (37 of 93 reactors or 40%) compared with that of the previous study (33 of 204 reactors or 16%). In addition, the median number of days between the day of collection of blood and milk samples and the date of the previous blood test in the herds was 92 days for this study and 112 days for the earlier study.

SUMMARY

1) A total of 1,289 lactating cows in 51 herds containing blood test reactor cows and 22 herds containing ring test suspicious-blood test negative or suspicious cows were tested for brucellosis by the serum plate test and the whey plate test.

2) Of the 93 blood test reactors, 26 were classified as negative by the whey plate test. Two blood test negative-whey test positive animals were found.

3) Brucella organisms were isolated from the milk or tissues of 9 (35%) of 26 blood test reactor-whey test negative cows. Of the 9 animals on which both milk and tissues were cultured, Brucella were isolated

from the milk and tissues of 1 and from the tissues but not the milk of 3 animals.

References

[1]Blake, G. E., Manthei, C. A., and Goode, E. R., Jr.: A Milk Plate Test for the Detection of Brucellosis. J.A.V.M.A., *120,* (1953): 1-6.

[2]Cameron, H. S.: The Interpretation of Whey Titers in the Diagnosis of Brucellosis. J.A.V.M.A., *129,* (1956): 581-583.

[3]Roepke, M. H., Stiles, F. C., White, T. G., and Driver, F. C.: A Study of the Whey Plate Test for Brucellosis. J.A.V.M.A., *131,* (1957): 170-173.

Strain 19 Brucellosis in Man.—In January, 1954, a physician sprayed his face and eyes with *Brucella abortus* vaccine when the needle was forced off the syringe while vaccinating a calf. One month later, lymph nodes of his neck were enlarged and tender and, on March 3, he became ill. After five weeks of therapy, chiefly with antibiotics, he was able to resume his practice. His agglutination test reached a peak (1:640) 16 weeks after infection, then receded. On April 1, 1957, a skin test for sensitivity to brucellergen (a suspensoid of nucleoprotein prepared from *Br. abortus* cells) was negative with a 1:100 dilution, but resulted in a 2-cm. area of erythema and induration with a 1:10 dilution. This reaction appeared in 24 hours and persisted beyond 72 hours.—*J. Am. M. A. (July 20, 1957): 1325.*

Brucella Suis with Suppurative Complications in Man.—Suppurative complication in brucellosis in man is rare, probably because the vast majority of cases are due to *Brucella abortus,* the least invasive of the three species, and because of the efficacy of antibiotics in the acute form. Three cases with long-standing suppuration have been encountered in one hospital, all due to *Brucella suis.* One had intermittent illness for 20 years with fever and suppurative lesions. Radiographs showed calcified areas in the liver and spleen and *Br. suis* was recovered from a suppurating area.—*New England J. Med. (Aug. 1, 1957): 209.*

Toxoplasmic Uveitis in Man.—Occurrence of the syndrome of infantile choroidoretinitis, often with hydrocephalus, convulsions, or other signs of cerebral damage due to uterine infection by *Toxoplasma gondii,* has been amply confirmed. The part played by toxoplasmosis in adult uveitis is less certain. One patient with a dye test titer of 1:64 and a negative complement-fixation test was blind with recurrent choroiditis, and viable Toxoplasma were isolated from the eye, indicating that an active toxoplasmic lesion may not evoke strong serological reactions. The majority of toxoplasmic infections probably are subclinical.—*Brit. Med. J. (Nov. 2, 1957): 1042.*

Diseases in Montana.—For the year ending June 30, 1957, the following disease incidence was reported in Montana.

In cattle, there was no anthrax (none in 4 years); there were 31 cases of anaplasmosis in 19 herds; 37 of 56 counties were declared brucellosis-free with the state infection rate 0.95 per cent; bacillary icterohemoglobinuria (red water) increased alarmingly in two counties and has been enzootic in four counties for several years (21,963 were vaccinated); leptospirosis continued to increase (8.7% positive in 50 herds); pulmonary emphysema continued to cause severe losses (395 cases in 93 herds); coccidiosis was serious in weaned calves (2,811 cases on 294 ranches); but only 2 reactors were found in 33,346 animals tested for tuberculosis.

In sheep, vibriosis caused severe loss of lambs in nine flocks; Johne's disease (paratuberculosis) continued to increase (in 4 years of testing with johnin, and eliminating reactors, the disease increased in one large band from 1.7 to 8.7%); therefore, control is now being attempted by vaccinating young lambs.

In swine, erysipelas is the disease of greatest importance (1,048 cases on 94 premises, most of them the chronic form); hog cholera appeared on only two premises (involving 76 swine), the low incidence being credited to good enforcement of the garbage-cooking law and the banning of virulent virus vaccination; there were 39 cases of atrophic rhinitis in nine herds.

In dogs, there were 449 cases of leptospirosis, 327 in one county (a potential source of human infection); rabies again was not reported in the state.

In chickens, the greatest loss continued to be from leukosis and coccidiosis; chronic respiratory disease was reported in nine flocks and Newcastle disease in one flock.—*Rep. Montana Livestock Sanitary Board, June 30, 1957.*

Experiences in California with the Whey Test for Brucellosis

H. S. CAMERON, D.V.M., Ph.D.

Davis, California

OUR REASON for wishing to use the whey test in the diagnosis of bovine brucellosis in California is not because of any lack of confidence in the blood test. However, the physical disadvantages of obtaining blood samples in certain areas, and the necessity for frequent testing of herds where the turnover in cattle is high, appeared to be too big a handicap to overcome in an all-out eradication program. In the 1930's, California attempted to eradicate brucellosis by blood test and slaughter. The attempt was an utter failure and left unpleasant memories. The failure was due to the type of dairy husbandry practiced in the state and to the necessity of frequent bleeding of cattle under conditions that made the obtaining of blood samples a major operation.

When the test and slaughter method failed, California pioneered in an immunization program and, in 1947, adopted a calfhood-vaccination regulation mandatory in dairy, and voluntary in beef, breeds between the ages of 6 to 12 months. Since that time, little testing has been conducted and, until recently, no restrictions were placed on the movement of cattle into or within the state—yet the incidence of brucellosis has been reduced from approximately 18 to 4 per cent, and abortion in cattle from *Brucella abortus* infection is no longer a serious economic problem. During this period, because of the heavy importation of dairy cattle into the state, considerable adult vaccination was of necessity practiced. Most of this was unofficial except for one year when blood-negative adults could be officially vaccinated.

THE BLOOD TEST

At the same time, it was realized that vaccination alone, while keeping the disease under control, would not eradicate infection, and that carrier animals must be detected and disposed of. When the expanded eradication program was initiated by the U.S.D.A., blood testing was the only official method permitted for diagnosing brucellosis in individual animals. Although recognizing the necessity for eradication and desiring to cooperate in the program, California dairymen were loath to enter into any agreement that meant blood testing. Their reasons, as follows, were sound:

1) Bleeding facilities in California dairy herds are usually inadequate and often nonexistent. Herds are large—70 per cent of the market milk is produced in herds averaging 125 cows. In the southern part of the state, the average is greater; herds of over 400 cows are common, with some as large as 1,500 cows where milking is a 24-hour operation. Cows are stanchioned briefly for milking and no other facilities are available for bleeding. In many barns, because of the type of construction, bleeding is impossible. There are numerous walk-through milking barns, none of which are suitable for stabling cows while blood samples are obtained. When not being milked, the cattle are at pasture or in feeding corrals all year. Even when possible, the simultaneous bleeding and milking are objectionable and restanchioning after milking is costly in labor and lowered milk production, especially in the larger herds.

2) Turnover in dairy cattle is great. It is common practice in certain areas to keep 400 cows on a 20-acre farm. Replacements can not be raised, but must be purchased through dealers, making frequent testing a necessity.

3) Many cows in California have, of necessity, been adult vaccinated and, although the majority are not infected, they give a positive or suspicious reaction to the blood test and are subject to being branded as infected animals.

THE MILK WHEY TEST

In view of the well-nigh impossible task of blood testing, it was determined to investigate the feasibility of adopting the milk whey test as a substitute for the blood test. This test was first suggested by the work of Theobald Smith, in 1922, which showed that the udder would participate in the production of antibodies when invaded by bacteria. Others who have worked with whey or milk as a diagnostic medium have been referred to in a previous publication.[1] The test now under investigation has been modified by using Brucella

From the School of Veterinary Medicine, University of California, Davis.

Presented before the General Session, Ninety-Fourth Annual Meeting, American Veterinary Medical Association, Cleveland, Ohio, Aug. 19-22, 1957.

[1]Cameron, H. S., Kendrich, J. W., and Merriman, R. W.: A Whey Plate Test for the Diagnosis of Bovine Brucellosis. J.A.V.M.A., 129, (1956):19-22.

ring test (BRT) antigen instead of serum plate antigen. In California, simultaneous blood and whey tests have been performed on over 20,000 cows and bacteriological examinations conducted on milk from cows where there was disagreement between results of the whey and blood tests. From this, we have concluded that the whey test under our conditions is as efficient as the blood test in diagnosing brucellosis and, for physical reasons, superior to it.

The test is conducted as follows: About 10 cc. of a composite milk sample from all four quarters is collected at any convenient time. To this, 2 drops of rennin is added and the milk is allowed to coagulate. The whey is then used in a plate test in a manner similar to that employed for blood serum, except that milk ring test antigen is used instead of serum antigen. This is important because the latter is not sensitive enough in many instances to detect agglutinins in whey. The amounts of whey used are 0.08, 0.04, 0.02, and 0.01 ml. Samples are screened at the 0.08-ml. of whey and, if positive, are tested in the other amounts. Strongly positive samples will react within five minutes but final readings are made at 15 minutes, precautions being taken that samples do not dry out in the meantime. Rarely, however, does a reaction change after ten minutes.

DISCUSSION

One of the outstanding advantages of the whey test is its ability to differentiate between the reaction caused by vaccination with strain 19 and the reaction caused by virulent infection. A whey titer will not persist more than 90 days after vaccination, while blood titers in cattle vaccinated as adults will persist for indefinite periods and tend to fluctuate periodically. The highest incidence of disagreement between blood and whey tests were in animals that were positive or suspicious to the blood test and negative to the whey test and, almost invariably, they had been vaccinated as adults or in late calfhood. The great majority of these animals were not infected, as determined by bacteriological examination of milk.

We have also compared the whey test with the official milk ring test, which is based on the same principle as the whey test—namely, the presence of agglutinins in milk. Here the agreement is remarkably close, in that BRT-negative herds are also negative when individuals are whey tested. Also, in BRT-suspicious herds, when whey reactors are removed, the herd BRT becomes negative. This phase of the work has also supplied information on the number of animals that could be included in a composite herd sample for the ring test, by making serial dilutions of positive milk samples until it becomes BRT negative. This will be the subject of a later report but, while there was a considerable variation, a significant number of composite samples were still BRT suspicious when diluted 1:200, the maximum attempted. A few, however, were BRT negative as low as 1:15. This presents a problem in California where pipeline milking into bulk tanks is widely used, and where it will be necessary to devise a system of periodic sampling from the line in large herds to conduct the ring test.

A pilot program, cooperative between the U.S.D.A., the California Department of Agriculture, and the University of California, is underway in a county to determine if the area could attain modified-certified, brucellosis-free status using the BRT to screen herds and the whey test to detect infected animals. The herds are large and, with few exceptions, pipelines to a bulk tank are used. Individual samples are collected in a 4-oz., wide-mouthed jar and composite samples from 15 cows are made for ring testing. At the same time, a sample from the bulk tank is also tested. If the herd is suspicious, the whey test is immediately conducted on the individual samples and the reactors are branded. A full report of this program will be made later.

The role of the practicing veterinarian in a whey-testing program is of interest. The question of who would obtain the milk samples was discussed at a meeting of veterinarians who are under contract to the state to officially vaccinate calves; this includes essentially all veterinarians engaged in large animal practice in the state. The group was unanimously of the opinion that the practicing veterinarian be personally responsible for obtaining the milk samples, as well as tagging and branding of reactors, should the whey test be included in an official program.

There are approximately 1 million dairy cows in California. The program has been one of vaccination alone but provision has now been made for area certification based on official tests, which means the blood and milk ring tests. The blood test is, of course, being conducted on beef herds, many of which cross state lines for sea-

sonal grazing and must conform with interstate regulations. However, there is essentially no exportation of dairy cattle and, therefore, little incentive to embark on a program of blood testing. The dairymen would welcome a whey-testing program and, with the assistance of the practicing veterinarian, the objective of eradicating brucellosis by 1960, as set by the National Brucellosis Committee, could be met.

CONCLUSION

Those of us in California who have worked with the whey test have the utmost confidence in it; in fact, an amendment has been included in state regulations providing for the branding of whey reactors. We can, however, appreciate the viewpoint that an innovation in a program already operating successfully must be thoroughly proved before being adopted for official use. It is for this reason that a pilot program is underway. At this time progress is satisfactory and there is every expectation that, before long, we will have another tool in the effort to eradicate brucellosis.

England Will Buy Pork from States Prohibiting Use of Virulent Hog Cholera Virus.—Because of the danger of importing virulent hog cholera virus, many European countries prohibit the purchase of pork from the United States. England has relaxed that barrier by agreeing to buy pork from the 14 states in which the use of virulent virus for vaccinating is prohibited. This should boost the swine industry, particularly in the southeastern section where eight of the 14 states are located. This includes Arkansas, Louisiana, and the block of states east, except Florida, and North Carolina. It also includes Kentucky, Illinois, Wisconsin, North Dakota, Montana, Utah, and New Mexico. European countries have a potential market for 80 million lb. of U. S. pork annually.—*Nat. Hog Farmer (Nov., 1957): 1.*

Cholera Lesions in Well, Vaccinated Pigs.—Of 67 pigs given crystal violet vaccine, in Hungary, 31 had macroscopic lesions of cholera, although the pigs appeared normal when killed five to 24 days later. Virus was not transmitted by the 2 tested pigs. No lesions were found in pigs given a similar crystal violet product made with the blood of normal pigs. Unvaccinated controls had no lesions. The lesions were believed to have resulted from the inactivated virus. —*Vet. Bull., (Nov., 1957): Item 3277.*

Vaccination and Hog Cholera Eradication.—We are moving, without urging, from the use of virulent virus and serum to the modified virus vaccines with or without serums, but mostly with serum. Ultimately, to accomplish eradication, we will use no living or modified vaccine but will use killed products only. Improved inactivated vaccines may be produced.—*L. M. Hutchings in Iowa Vet. (Nov., 1957): 42.*

The Effect of Chlortetracycline Treatment of Turkeys Affected with Ornithosis

When chlortetracycline was fed in an all-mash ration to ornithosis-infected 3-week-old poults for two weeks, it was found that with 100, 200, 400, and 800 Gm. per ton the virus was not eliminated from these birds. However, when similar treatment was given for three weeks in concentrations of 200 Gm. or more of the drug per ton, no virus could be recovered.

This information was applied to later experiments involving adult turkeys. No virus was recovered from experimentally infected adult turkeys treated for two weeks with feed containing 200 Gm. of the drug per ton. Experimentally infected adult turkeys that were given no treatment apparently were able to eliminate the virus after 31 days. Virus was recovered from some untreated, infected adult turkeys after 24 days.

In conjunction with these experiments, a flock of naturally infected turkeys was treated with this type of therapy and it was necessary to continue medication for three weeks to suppress the virus. It is essential that medication be given in an all-mash ration (no scratch grain) to insure proper treatment of all birds. Clinical response to therapy is remarkable, which may cause the owner to decrease drug content during the latter part of the three-week treatment period—this is to be avoided if birds are to be marketed.—[*D. E. Davis and J. P. Delaplane: The Effect of Chlortetracycline Treatment of Turkeys Affected with Ornithosis. Am. J. Vet. Res., 19, (Jan., 1958): 170-174.*]

Anthelmintics for Poultry

R. D. TURK, D.V.M., M.S.

College Station, Texas

SINCE THE beginning of the poultry industry, satisfactory and effective anthelmintics have been sought. Many drugs have been recommended, yet comparatively few of the many species of helminths that parasitize poultry can be effectively and safely removed by medication.

Preventive measures, including sanitation, hygiene, and good management, have been responsible for the greatest progress in parasite control. In poultry, internal parasites should be much easier to control by preventive measures than in any other domestic animal. Prenatal infection (egg transmission) does not occur; the young are usually produced in clean incubators, and can be raised under practical conditions without the risk of infection from older animals. Actually, internal parasites could be optional with poultry producers but, unfortunately, management practices often are such that helminths cause serious economic losses. Instead of correcting the conditions that are so obviously responsible for such losses, many persons feel that "anthelmintics" are all that is necessary. Unfortunately, anthelmintics do not replace sanitation, hygiene, or good management; they merely supplement them. Often, the damage done by parasitic infections is beyond repair and, as in other classes of animals, reinfection may be the rule rather than the exception.

No attempt will be made to list the many drugs and chemicals that have been used as anthelmintics for poultry. Instead, a more detailed account will be given of some that have been used with some degree of success. A brief account of some of the more important helminths will also be given.

TREMATODES (FLUKES)

Many species of trematodes have been reported from poultry: e.g., about 50 species from chickens, 12 from turkeys, and up to 75 from ducks. Serious losses may result from gross infections but, in comparison with other disease-producing agents, flukes are of minor importance.

All flukes parasitic in domestic fowl require a snail as intermediate host. Control consists, therefore, of eradication or control of snails or of keeping poultry away from areas where snails exist. Fluke infections are rarely diagnosed antemortem and no medicinal treatments have been shown to be effective against the vast majority, although carbon tetrachloride, in doses of 1 to 3 ml., has been suggested for those occurring in the digestive tract and in the oviduct.[13] Other drugs may be of some value, but actual control must be by preventive measures.

CESTODES (TAPEWORMS)

In the United States and its possessions and in Canada, 14 species of tapeworms have been found.[3] Of these, seven species are generally distributed throughout North America. The damage produced by tapeworms of poultry has long been a source of contention. Certain investigators have reported leg weakness and paralysis, capillary congestion, proliferation of epithelium, fibroses, catarrhal enteritis, and cachexia as being associated with tapeworm infections. However, the relationship of tapeworms to these various conditions is unknown, since many of them have been reported from birds free of tapeworms.

Under ordinary conditions, birds may tolerate a heavy infection with little or no evidence of damage. Some species of tapeworms apparently are not injurious to birds kept on a balanced diet. Birds infected with 1,000 cysticercoids of *Hymenolepis carioca* were reported to have practically the same growth rate as uninfected birds.[12] Young birds and those in heavy production probably are less productive when parasitized by tapeworms.

The growth rates of Rhode Island Red and White Leghorn chicks were reported to be retarded by infections with *Raillietina cesticillus*.[6] However, it was found that growing chicks, parasitized at 40 days of age, were not significantly harmed by infections of 2 to 172 *R. cesticillus* during an eight-week period.[1] The average of 61.5 worms per bird found in that experiment

Dr. Turk is professor and head of the Department of Veterinary Parasitology, A. & M. College of Texas and Texas Agricultural Experiment Station, College Station.

is probably more than is usual in birds on the average poultry farm.

The most pathogenic of the tapeworms probably are *Davainea proglottina*, found only where its intermediate hosts (snails and slugs) thrive, and *Raillietina echinobothridia* and *Raillietina tetragona* which utilize ants as intermediate hosts.[9]

If environmental conditions are such that a large percentage of birds are infected, those conditions should be changed. Usually only a few birds in a given flock will harbor excessive numbers of tapeworms and, judging from data from the diagnostic laboratories of the Texas Agricultural Experiment Station,[2] many have few or none. Tapeworms were diagnosed as the primary source of trouble in only 5 of 11,307 birds submitted.

Treatment of tapeworm infections in poultry is often of limited value. As with anthelmintics for other animals, the drug should be inexpensive, nontoxic, effective, and easy to give. To date, only a few compounds have shown promise.

In a series of tests on experimentally infected birds, a tetravalent tin compound, di-n-butyl tin dilaurate (butynorate), was found to be effective against *R. cesticillus* in single doses of 75 mg. per kilogram of body weight.[4,10] It was also effective when administered in feed. In addition, 125 mg./kg. also removed *R. cesticillus, R. tetragona, Choanotaenia infundibulum, Hymenolepis carioca, Amoebotainea sphenoides,* and *D. proglottina*.[4] However, *D. proglottina* was more difficult to eliminate than were *R. cesticillus and C. infundibulum*.

Little or no data have been presented to show whether the increase in weight gain, production, and general well being of the treated birds offsets the cost of treatment, under field conditions and using large numbers of birds. However, when tablets containing 50 mg. of hexachlorophene, 500 mg. phenothiazine, and 50 mg. nicotine were given to laying hens[8] that were thought to be infected with tapeworms, those in one pen, that were producing 140 eggs daily, produced only 22, 18, 23, and 24, respectively, on the four days following treatment. In another pen where the hens had been producing 24 eggs daily, they produced none, 1, none, and 1 for a like period. Production did not return to normal until three weeks later. It was concluded that laying hens should not be medicated with hexachlorophene. Data have been presented on weight gains, which showed that di-n-butyl tin dilaurate was relatively nontoxic.[10] The compound apparently does not affect egg production in chickens.

NEMATODES (ROUNDWORMS)

Nematodes, or roundworms, as a group are probably the most important parasites of poultry; 22 species have been reported from North America.[3] A satisfactory medicinal treatment is available for only three species. Barium antimonyl tartrate was shown to be effective in removing *Syngamus trachea* when administered as an inhalant.[15] Phenothiazine has been shown by a number of workers to be an effective and safe treatment for the removal of the cecal worm, *Heterakis gallinae*. Among the drugs that have been advocated for the removal of the large roundworm, *Ascaridia galli*, are: carbon tetrachloride, tobacco stems, nicotine sulfate, and combinations of nicotine with other agents such as bentonite and phenothiazine. These treatments have been discussed in detail[16] and need not be further discussed, except to state that the optimum dose of nicotine alkaloid is, apparently, 50 mg. per bird.

There have been many reports on the use of piperazine compounds as anthelmintics for poultry since that on piperazine citrate in 1955.[14] A typical report was one on piperazine carbon disulfide, piperazine adipate, and piperazine citrate.[7] All compounds used completely eliminated adult Ascaridia when given in single doses varying from 100 to 500 mg. per kilogram of body weight, according to the compound used. None was outstandingly effective against larvae in the tissue. There was some reduction in the number of larvae in the lumen of the intestine, but many were not removed; some reduction in tissue larvae may have occurred.

All of the piperazine compounds tested produced narcosis in the worms which were then expelled by normal peristaltic action.

Nicotine was found to reduce the motility of *A. galli*.[11] Those worms in the lumen of the intestine are most apt to be removed and, obviously, the larger the worm, the better the chance for it to be removed by either nicotine or piperazine compounds. In 1954, it was reported that nicotine and other anthelmintics were not effective against tissue larvae of *A. galli*.[5]

It was found[5] that the antibiotic chlortetracycline (Aureomycin), at the rate of 18 mg. per chick per day for 11 days, starting on the eleventh day following exposure, did not affect the number of tissue larvae but did stimulate the growth of the larvae. Therefore, the treatment of fowl for ascariasis must continue to be directed primarily against the adult worm. To date, nothing has been shown to be effective against larvae that are in the tissue.

In agreement with the majority of other reports, our observations have been that piperazine compounds were effective against adult Ascaridia, removed a variable number of larvae in the lumen of the intestine, but were slightly, if at all, effective against the tissue stages. The compounds tested were palatable and nontoxic.

CONCLUSIONS

Flukes.—No anthelmintic will control fluke infections in poultry, even though certain drugs might remove some of those in the digestive tract.

Tapeworms.—Flock treatment for tapeworms may often be economically unfeasible.

Gapeworms.—This parasite is usually not a problem in commercial flocks and is rarely seen in any domestic birds in the Southwest.

Ascaridia.—None of the available anthelmintics are particularly effective against the tissue-inhabiting forms of ascarids, and are only partially effective against immature lumen-dwelling larvae.

It appears that control of the numerous helminths of poultry in the United States is primarily a matter of prevention. Proper management practices can keep parasitic infections to a minimum, at least in commercial flocks. Before anthelmintic medication is recommended for a particular flock or group of birds, the type and incidence of parasitism should be determined. Every possible effort should be made to correct the conditions that are responsible for allowing the primary parasitism to develop.

References

[2]Ackert, J. E., and Wisseman, C. L., Jr.: Tolerance of Fowls for Moderate Infections of Intestinal Helminths. Am. J. Trop. Med., *26,* (1946): 721-728.

[3]Anon.: Progress Report 1780, Texas Agricultural Experiment Station (Poultry Diagnostic Laboratories report), April 15, 1955.

[4]Dikmans, G.: Check List of the Internal and External Animal Parasites of Domestic Animals in North America. Am. J. Vet. Res., *6,* (1945): 211-241.

[5]Edgar, S. A.: The Removal of Chicken Tapeworms by di-n-Butyl Tin Dilaurate. Poult. Sci., *35,* (1956): 63-73.

[6]Hansen, M. G., Persand, B. R. B., and Ackert, J. E.: Effects of Certain Anthelmintics and an Antibiotic on Lumen and Tissue Phase Larvae of *Ascaridia Galli* (Shrack 1788). Poult. Sci., *33,* (1954): 140-146.

[7]Harwood, P. D., and Luttermoser, G. W.: The Influence of Infections with the Tapeworm *Raillietina Cesticillus* on the Growth of Chickens. Proc. Helminthol. Soc. Washington, *5,* (1938): 60.

[8]Horton-Smith, C., and Long, P. L.: The Anthelmintic Effect of Three Piperazine Derivatives on *Ascaridia Galli* (Shrack 1788). Poult. Sci., *35,* (1956): 606-614.

[9]Hungerford, T. G.: Hexachlorophene for Treatment of Tapeworms in Poultry. Austral. Vet. J., *31,* (1955): 275.

[10]Jones, M. G., and Horsfall, M. W.: Ants as Intermediate Hosts for Two Species of Raillietina Parasitic in Chickens. J. Parasitol., *21,* (1935): 442.

[11]Kerr, K. B.: Butynorate, An Effective and Safe Substance for the Removal of *Raillietina Cesticillus* from Chickens. Poult. Sci., *31,* (1952): 328-336.

[12]Kerr, K. B., and Cavett, J. W.: A Technic for Initial Evaluation of Potential Anthelmintics. Exptl. Parasitol., *1,* (1952): 161.

[13]Luttermoser, G. W.: The Effect on Growth Rates of Young Chickens of Infections of the Tapeworm *Hymenolepis Carioca.* Proc. Helminthol. Soc. Washington, *7,* (1940): 74-76.

[14]Price, E. W.: Trematodes of Poultry. In "Diseases of Poultry" by H. E. Biester and L. H. Schwarte. 2nd ed. Iowa State Press, Ames, 1948.

[15]Shumard, R. F., and Eveleth, D. F.: A Preliminary Report on the Anthelmintic Action of Piperazine Citrate on *Ascarida Galli* and *Heterakis Gallinae* in Hens. Vet. Med., *50,* (1955): 203-205.

[16]Wehr, E. E., Harwood, P. D., and Schaffer, J. M.: Barium Antimonyl Tartrate as a Remedy for the Removal of Gapeworms from Chickens. Poult. Sci., *18,* (1939): 63.

[17]Wehr, E. E.: Nematodes and Acanthocephalids of Poultry. In "Diseases of Poultry" by H. E. Biester and L. H. Schwarte. 2nd ed. Iowa State Press, Ames, 1948.

An Antimycotic Antibiotic.—A new antibiotic called "amphotericin," not yet available, seems to be effective against certain mycotic infections. It was used in six men with cryptococcic meningitis, five of whom were alive five to ten months later, three of them free of symptoms. It has also shown effectiveness against histoplasmosis and is being investigated in coccidioidomycosis, blastomycosis, and moniliasis infections. It can be injected or given *per os.* It is derived from a species of Streptomyces fungus found in Brazil.—*Sci. News Letter (Oct. 12, 1957): 232.*

Hemilaminectomy in a Dog with Bone Graft and Metal Internal Fixation

ARTHUR YALE KAVIT, D.V.M.

Richmond, Virginia

IN PET ANIMALS, fractures of the spine pose a difficult problem for the practitioner. Unlike the human patient, animals are not easily nursed for prolonged periods. Paraplegia, urinary retention or incontinence, cystitis, urine scalding, decubital sores, and hypostatic pneumonia lead the practitioner to advise euthanasia. However, the following case illustrates how an animal with a fractured spine was restored to normal function.

CASE REPORT

Clinical Examination.— On June 9, 1955, a large, mixed-breed male Setter, 4 years old, was admitted shortly after being hit by a car. There was a flaccid paralysis of the right hindleg and spasticity of the left hindleg but, if assisted, the dog could bear some weight on the latter. The tail drooped, there was complete right and left lateral instability of the spine, and the dog would fall or jackknife to the right or left, thus indicating that the ligamentous structures were probably disrupted. He showed a moderate flexor reflex of the left hindleg but no reflex of the right when the foot pads were pinched. The toes on the right hindleg were knuckled under. There was urinary incontinence.

X-Ray Examination.—A lateral radiograph (fig. 1) revealed a fracture through the vertebral body of the sixth lumbar vertebra (L6) and about ¼ inch of anterior displacement of the fragment of the vertebra. Euthanasia was suggested but was refused, so a consultation was held with an orthopedic surgeon* who suggested that, if the cord could be decompressed by laminectomy and stability of the spine established, the pressure on the spinal nerves might be reduced and function restored.

Surgical Procedure.—Two days after admittance, the area from the thoracic vertebrae to the sacrum was prepared, and an anesthetic (pentobarbital sodium) was given to effect. The area was draped and a long midline incision was made from approximately L4 to the sacrum. The dorsal lumbar fascia was incised and the lumbar muscles were separated from the dorsal spines by blunt dissection, using blunt scissors and periosteal elevators. The hemorrhage was profuse. Later, the orthopedic consultant suggested that, had large self-retaining retractors been used, the surgery would have been much easier and compression by the retractors would have prevented much of the bleeding.

Exposure of the vertebra revealed that

Fig. 1—Radiograph showing a comminuted fracture of the sixth lumbar vertebra with approximately ¼ inch displacement of the lower fragment in a 4-year-old dog.

Dr. Kavit is a general practitioner in Richmond, Va.

*The author thanks Dr. Bernard Packer for his advice and assistance.

the fracture extended through the bony side wall of the vertebral canal anterior and posterior to the articulation, in addition to the fracture of the vertebral body. Using the transverse process as a lever, the muscles were dissected off the articular processes, lateral wall, and roof (pedicle and lamina) of the vertebra. The bone fragment was removed and saved for graft material. Decompression was obtained when the right side of the vertebral canal was opened; however, all surgery was extradural. The lamina and spinous process of L7 and L5 were scraped and curetted along with the remnants of L6. A Sherman SMO slotted, stainless steel plate was used to bridge the opening. The plate (fig. 2, 3) extended from L3 posteriorly beyond L7. Collison milled-end (cutting type)

Fig. 2—Lateral radiograph, 18 months postsurgery, showing that continuity of the spinal canal has been re-established.

Fig. 3—Dorsoventral radiograph, 18 months postsurgery, showing Sherman SMO slotted, stainless steel plate and collison milled-end screws securely anchored to the spinous processes. Good bridging across fracture site (arrow) is evident.

screws were inserted through the plate and transversely through the spinous processes of L4, L5, and L7. (It was evident later that a screw through a hole in the plate at L6 would have anchored the plate even more securely.) The removed fragment of L6 was now crumbled with the aid of a bone rongeur and packed on both sides of the fractured area as graft material; 500,000 units of penicillin in sterile saline was sprayed on the area. The muscles were approximated with interrupted sutures of No. 0 chromic gut and the skin incision was closed with interrupted cotton sutures.

There were no postoperative complications. The wound healed well and the skin sutures were removed on the seventh and tenth days. The dog was placed on his feet daily and his back no longer swayed. Urine retention now replaced the former incontinence and it was necessary to compress the bladder to produce urination. The dog was discharged about three weeks postoperatively, at which time his eliminations were normal and he could stand unassisted. He continued to drag the right toes for about a month. Three months after surgery, the dog was able to run and jump. However, he was still unable to elevate his tail.

Radiographs (fig. 2, 3) taken 18 months after surgery revealed the plate securely anchored to the spinous processes, good bridging across the fracture site by new bone growth, and re-established continuity of the spinal canal.

DISCUSSION

Since the conus medullaris lies over the junction of the sixth and seventh lumbar vertebrae,[2] it can be seen that we are dealing with a true cord lesion. Such plates are reported[1] to work well except in young or large dogs where the stress may fracture the spinous processes; however, this plate has given no trouble in over two years.

SUMMARY

A fracture of the sixth lumbar vertebra with spinal cord damage in a dog was repaired with a steel plate, plus a bone graft after decompression of the spinal canal. The dog was restored to normal activity except for elevation of his tail.

References

[1]Hoerlein, B. F.: Methods of Spinal Fusion and Vertebral Immobilization in the Dog. Am. J. Vet. Res., *17*, (Oct., 1956): 695-709.

[2]Sisson, S. S.: The Anatomy of the Domestic Animals. W. B. Saunders Co., Philadelphia (1941): 869.

Notes on Artificial Insemination.—In 1955, about 3 of 4 cows in Denmark were artificially inseminated, as were about half those in Great Britain, Sweden, and Holland. Feed does not markedly affect semen quality; adding protein or vitamin A and B above normal requirements has resulted in no significant improvement in conception rate, but feeding natural *alpha* tocopherol has improved the storage quality of semen. Electrical ejaculation was reported in rams in 1936, but has been used practically with bulls for only two years. By this means, valuable old bulls, too arthritic or lacking in libido for service, have been used for several additional months.—*J. M. McLean in A.I. Digest (Nov., 1957): 21.*

Repair of Aneurysms with Prostheses.—Orlon or nylon prostheses were used in 18 patients with abdominal aneurysms, and 12 have been leading a fully active life, the longest for 24 months. Of three patients with frank rupture of the aneurysm, one survived with resection and replacement by the graft. Postoperative coronary occlusion caused the death of three patients.

A five-year observation of canine thoracic homograft, fresh or preserved, showed that these grafts developed serious degenerative changes of calcification, ulceration, and loss of elasticity.—*Ann. Surg. (July, 1957): 78 (abstr. in J.Am.M.A., Nov. 9, 1957: 1326).*

Prosthetic Replacement of Mid-Shaft of the Radius.—For a study of replacing the middle half of the shaft of a long bone, the radius of the dog was selected since it is "splinted" by the ulna. A rodlike titanium prosthesis inserted into the remaining segments of the bone maintained them in their normal position and added little to the weight of the bone. A sheath of callus formed around the prosthesis, restoring the continuity of the bone in about six to 12 months.—*W. I. Gay in Am. J. Surg. (Nov., 1957): 747.*

Placental Transmission of Antibodies.—Following vaccination of pregnant women with the Salk vaccine, antibodies were transferred to the fetus. After birth, the antibody level gradually fell, the half-life being about 50 days, but in three of six children, antibodies were detectable at seven to 11 months after birth.—*J.Am.M.A.(Nov. 2, 1957): 1171.*

Placental and Mammary Transfer of Antibiotic.—When pregnant rats were fed chlortetracycline (Aureomycin) 2 Gm./kg. of feed, the conception rate was improved but the number and size of the fetuses was not affected; the antibiotic was found in the fetal tissues. At levels of 0.5 to 2.0 Gm./kg. of feed, the antibiotic could be detected in the milk and in the tissues of the suckled young.—*Vet. Bull. (July, 1957): Item 2151.*

Nephrectomy in Cattle.—Experimental unilateral nephrectomies were performed, in Russia, on 4 cattle, 7 to 9 months old, under local anesthesia. The operation may be indicated in cases of pyelonephritis, abscess, or tumor.—*Vet. Bull. (Sept., 1957): Item 2866.*

Anesthesia for Bovine Cesarotomy.—For the flank approach in bovine cesarotomy, use infiltration of the line of incision; for the ventral midline approach, use epidural (30 to 40 cc. of 2% procaine for heifers) anesthesia, but if the incision is carried anterior to the umbilical region, local infiltration is required.—*J. D. Wheat in Iowa Vet. (Nov., 1957): 36.*

Weight Gain in Human Pregnancy.—Pre-eclamptic toxemia developed in only 2.6 per cent of women whose average weekly gain during gestation weeks 20 to 36 did not exceed 0.5 lb., whereas signs of pre-eclampsia occurred in 26 per cent of those who gained 1.75 lb. weekly. The infant death rate was least in those with a moderate weight gain (0.8 to 1.5 lb.).—*J.Am. M.A. (June 22, 1957): 877.*

Studies on Experimental Epizootic Bovine Abortion

J. A. HOWARTH, D.V.M., Ph.D.; J. E. MOULTON, D.V.M., Ph.D.;
J. D. WHEAT, D.V.M.

Davis, California

IN A PREVIOUS REPORT, epizootic bovine abortion was described as an entity in which abortion occurred during the sixth to eighth month of gestation.[2] An abortion rate of 30 to 40 per cent was encountered, with the disease being restricted to the seasonal period of July through October under California conditions. Once established in a herd, the disease recurred annually, with losses confined to first-calf heifers, except during the first year when all age groups were affected. Fetal pathological changes included subcutaneous edema, ascites, esophageal and tracheal petechiae, and degenerative hepatopathy.

Cultural examination of aborted fetuses showed streptococci and micrococci to be the dominant bacterial invaders. These organisms were nonpathogenic when inoculated into mice and guinea pigs. Blood and tissues from aborted fetuses caused no visible sickness when inoculated into mice and guinea pigs. Citrated blood collected from cows during the febrile preabortion period did not produce any evidence of febrile response or sickness when inoculated intramuscularly into calves 4 months of age. Efforts to produce abortion in cows by the combined intravenous and intramuscular injection of blood and tissue emulsions were not successful.

It is difficult to obtain pregnant cows known to be susceptible to this disease; therefore, to avoid maternal immunity interference, inoculations were made directly into the fetus, using a technique which readily reproduced equine virus abortion.[1] This paper reports our attempts to reproduce this disease and describes the surgical methods employed.

MATERIALS AND METHODS

Preparation of Inoculums.—Spleen and liver tissues of fetuses showing the characteristic lesions of epizootic bovine abortion were selected for use. All tissues used in preparing the inoculums had been kept frozen at −20 C. for six to eight months. After thawing, equal portions of spleen and liver tissue were homogenized in a Waring blender, and a 25 per cent suspension of tissue in physiological saline was prepared. Centrifugation at 500 r.p.m. removed the larger tissue fragments from the suspension.

In experiments 1 and 2, the unaltered tissue suspension was the inoculum. In experiment 3, the tissue suspension was subjected to further centrifugation in a refrigerated centrifuge at 40,000 r.p.m. for 30 minutes. Subsequent bacterial studies failed to show the presence of bacteria in the supernatant fluid. In experiment 4, antibiotics were used to inactivate any bacteria present in the inoculum. To each milliliter of tissue suspension, 5,000 units of penicillin and 2 mg. of streptomycin were added, and the mixture was held at 4 C. for 12 hours. In each instance, the amount of the inoculum was 25 ml.

Inoculation Procedure.—The left paralumbar fossa was shaved and disinfected, the line to be incised was infiltrated with a 2 per cent solution of procaine hydrochloride, and a vertical incision 8 inches long was made through the skin, muscle, and peritoneum.

The gravid uterus was located manually and, when possible to do so, the pregnant horn of the uterus was pulled over to the incision. The thoracic cavity of the fetus was determined by palpating the fetal ribs through the intact uterine wall. A 4-inch, 18 gauge needle was directed through the wall of the uterus, then between the ribs into the fetal thoracic cavity. A syringe was attached to the needle and the inoculum injected.

When the fetus could not be pulled to the incision, the injection was made using a 3-ft. section of rubber tubing attached to the needle. Careful manipulation was necessary to carry the needle, shielded in the closed hand, down to the desired site.

After the injection, the incision was closed using a simple continuous suture of No. 2 catgut in the peritoneum and muscles, and simple interrupted No. 2 Dermalon sutures in the skin. No wound aftercare was required.

RESULTS

Experiment 1.—An unaltered suspension of spleen and liver tissue was injected into the uterine artery of 1 cow, seven months' pregnant. There was no reaction, and a healthy calf was born following a normal gestation period. An aliquot of the tissue suspension was inoculated intrathoracically into a 7-month intrauterine fetus of another cow. In this case, abortion occurred nine days after inoculation (table 1).

From the School of Veterinary Medicine, University of California, Davis.

TABLE I—Summary of Attempts to Reproduce Epizootic Bovine Abortion in 9 Cows

Exper.	Fetus age	Method of inoc.	Inoculum		Result	Remarks
			Source	Treatment		
1	7 mo.	Uterine artery	Spleen and liver tissue	None	Normal birth	Bacteria in inoculum
	7 mo.	Fetus i.t.*	Spleen and liver tissue	None	Abortion in 9 days	Bacteria in inoculum
2	6 mo.	Fetus i.t.	Spleen and liver tissue	None	Abortion in 11 days	Bacteria in inoculum
	6 mo.	Fetus i.t.	Spleen and liver tissue	None	Normal birth	Bacteria in inoculum
3	8 mo.	Fetus i.t.	Spleen and liver tissue	High-speed centrifugation	Abortion in 9 days	No bacteria in inoculum
	8 mo.	Fetus i.t.	Streptococcus culture	None	Abortion in 4 days	Bacteria in inoculum
4	8 mo.	Fetus i.t.	Spleen and liver tissue	Penicillin, streptomycin	Abortion in 9 days	No bacteria in inoculum
	5 mo.	Fetus i.t.	Spleen and liver tissue	Penicillin, streptomycin	Normal birth	No bacteria in inoculum
	5 mo.	Fetus i.t.	Spleen and liver tissue	Penicillin, streptomycin	Normal birth	No bacteria in inoculum

*Intrathoracic

The fetus showed extensive subcutaneous edema; 250 ml. of transparent, yellow-tinged fluid in the peritoneal cavity; petechiation of the esophagus, larynx, and trachea; a large orange-tinged liver; fibrinous adhesions in the pericardium; soft, dark red thyroids; and swollen, reddened anterior cervical lymph nodes.

On microscopic examination, the liver showed numerous small foci of necrosis distributed without respect to lobulation and without inflammatory reaction, and dark red thyroids showed massive interstitial hemorrhage. The thick, unorganized layer of fibrin on the epicardium contained numerous pockets of neutrophils.

Streptococci were isolated from the heart blood, liver, and abomasum. It was nonpathogenic when inoculated intraperitoneally into mice.

Experiment 2.—An unaltered suspension of spleen and liver tissue was injected into the thoracic cavities of fetuses of 2 cows at the sixth month of gestation. One fetus was carried to term and was strong and vigorous at birth. Eleven days after inoculation, the other fetus was aborted.

The pathological findings included petechiation of the esophagus, trachea, and anterior cervical lymph nodes, scattered hemorrhages in the masseter muscles, pale foci in the liver, and extensive edema of the gallbladder. Microscopic examination of the liver showed generalized lipidosis and many venules filled with neutrophils. Mononuclear infiltrations were present in the portal areas.

Streptococci isolated from the heart blood, liver, and kidney were nonpathogenic when inoculated intraperitoneally into mice.

Experiment 3.—A suspension of fetal spleen and liver tissue, freed of bacteria by means of high-speed centrifugation, was injected into the thoracic cavity of an 8-month intrauterine fetus. Abortion of a premature, weak, and depressed calf followed in nine days. This calf was electrocuted one hour after birth.

The gross pathological findings included petechiation of the nasal mucosa, trachea, and thyroid, plus peripheral reddening of the anterior cervical lymph nodes. Microscopically, there was acute splenitis and the liver showed uneven lobular staining, with the central parts of the lobules appearing more acidophilic. Micrococci present in the heart blood and spleen were nonpathogenic when inoculated into mice.

Five milliliters of a broth culture of streptococci, isolated from the liver of an aborted fetus, was inoculated intrathoracically into the fetus of a second cow, eight months' pregnant. Four days later, a partially decomposed fetus was aborted. Interpretation of possible pathological lesions was difficult because of marked postmortem autolysis. Multiple ecchymotic epicardial hemorrhage was the only recognizable change. The advanced state of autolysis prevented cultural and microscopic studies.

Experiment 4.—A suspension of spleen and liver tissue freed of bacteria by addition of penicillin and streptomycin was used for the intrathoracic inoculation of

the fetuses of 3 cows. Two of the cows, which were in their fifth month of gestation, carried their calves to term and calved normally; the third, in her eighth month of gestation, aborted nine days after inoculation. Although alive, this calf was unable to stand or nurse. On necropsy, the only lesions observed were petechiation and edema of the digestive canal and peritoneum. Microscopically, some hepatic cells were swollen and vacuolated. Cultural examination of the various tissues failed to disclose the presence of bacteria.

DISCUSSION

In a previous paper, the authors reported unsuccessful attempts to produce abortion by injecting fetal material into pregnant cows by the combined intravenous and intramuscular routes. It seemed probable that in an immune cow the infectious agent would be prevented from reaching the fetus via the normal circulation, yet the fetus would remain fully susceptible because of the impermeability of the placenta to maternal antibody. In the present series of experiments, routes of inoculation were used which would bypass the tissue-filtering mechanisms and circulating antibody. Direct injection into the uterine artery failed to produce abortion, either because of neutralization by circulating antibody or the inability of the infectious agent to penetrate the placental barrier.

Abortion resulted in two of three instances of intrafetal inoculation of crude tissue suspensions containing bacteria.

Examination of these aborted fetuses revealed lesions similar to, but not as extensive as, those occurring in the natural disease. The well-advanced liver changes, characteristic of field cases of the disease, were not found in experimental fetuses. Bacteria isolated from the aborted fetuses were similar to those contained in the inoculum; however, their source was not established since there was no means of determining the flora of the uterine fluids at the time of inoculation.

Inoculation with streptococci isolated from a field case of abortion caused abortion in four days, but the fetal lesions were not typical of epizootic bovine abortion.

Four intrafetal inoculations of bacteriologically sterile suspensions produced two abortions, each at the ninth day after injection. Lesions similar to those of the natural disease were present in both fetuses, but the characteristic liver changes were not observed.

Since 4 of the 9 experimental cows calved normally, the abortions which occurred were probably not due to surgical trauma. The results of these experiments support the contention that a new type of bovine abortion has been recognized. The causative agent of the disease may be one that requires living cells for growth and can not be grown on artificial mediums. However, it is possible that the inoculums contained a toxin. With the exception of the Streptococcus culture, each inoculum contained spleen and liver tissue from an aborted fetus which was preserved and treated in a manner that would not destroy toxins.

Streptococci and micrococci isolated from aborted fetuses were assumed to be secondary invaders.

SUMMARY

Epizootic bovine abortion was reproduced by the intrathoracic injection of intrauterine fetuses with fetal tissue suspensions from naturally occurring cases of epizootic bovine abortion. Abortion occurred in 4 of 9 experimental animals. In two instances, abortion was produced when bacteriologically sterile inoculums were used. Lesions similar to those of the natural disease were present, but the characteristic liver changes were not observed.

References

[1]Doll, E. R.: Intrauterine and Intrafetal Inoculations with Equine Abortion Virus in Pregnant Mares. Cornell Vet., *43*, (1953): 112-121.

[2]Howarth, J. A., Moulton, J. E., Frazier, L. M.: Epizootic Bovine Abortion Characterized by Fetal Hepatopathy. J.A.V.M.A., *128*, (May 1, 1956): 441-449.

Meprobamate Toxicosis.—A woman, one of several affected, developed a rash, severe rigor, and pyrexia (101 F.) two hours after being given 400 mg. of meprobamate (Equanil) to alleviate anxiety over air travel. Two hours later, there was diarrhea, vomiting, and extreme malaise, fcllowed by leukocytosis. She was treated with diphenhydramine hydrochloride (Benadryl), 50 mg. orally, three times daily, and recovered in 48 hours. She had not taken the drug previously.—*Brit. Med. J. (Oct. 26, 1957): 1000.*

Paratyphoid Dysentery and Paratyphoid Abortion in a Flock of Bred Yearling Ewes

C. L. VICKERS, D.V.M.; B. W. BIERER, V.M.D.;
R. E. ATKINSON, D.V.M.; CLIFTON MUDGE, B.S.; O. E. BAKER, D.V.M.

Columbia, South Carolina

PARATYPHOID DYSENTERY was reported in sheep as early as 1920 in Germany, and since that time it has been reported as occurring frequently in this country.[2] Abortion caused by paratyphoid bacteria was first described in Germany, in 1921, and an enzootic was described in England in 1925.[1] The organism isolated was given the name *Bacterium (Salmonella) abortus ovis*. Additional reports have been made on this condition and at least one described the organism as being a near relative of *Salmonella paratyphi A*.[2] These conditions have always been reported as separate disease entities. It is the purpose of this paper to report a possible concurrent paratyphoid dysentery and paratyphoid abortion in the same flock of sheep.

On Sept. 18, 1956, 290 white-faced bred yearling ewes were shipped via truck from Ohio to South Carolina. They were enroute approximately 26 hours, and it can be assumed they were without feed or water for 30 hours or more. The first sign of disease in the flock was the finding of an aborted fetus about 24 hours after arrival. In the next two days, several more ewes aborted and, the fourth day after arrival, several developed a diarrhea. The diarrhea eventually occurred in all of the ewes that had aborted and in many that had not. The same day the diarrhea was first noticed, 1 of the ewes was found dead. Necropsy revealed no significant internal lesions other than a mild inflammation of the intestinal tract. The spleen was cultured and *Salmonella typhimurium* was recovered.

Following isolation of *S. typhimurium*, a tentative diagnosis of paratyphoid infection was made, and a culture of the suspected organisms was submitted to the Enteric Unit of the Communicable Disease Center, Laboratory Branch, Chamblee, Ga., for positive identification. While awaiting the report, additional specimens were collected from the flock for bacteriological study. Cultures were taken from the vagina of 1 of the ewes that had aborted and from 1 that had not aborted. Other cultures were taken from the rectums of sick ewes and also from fecal material on the ground. One culture was secured from an aborted fetus by reflecting the skin and inserting a sterile swab through the underlying tissues into the abdominal cavity. Of 36 cultures collected, 16, including the two vaginal cultures and the culture from the aborted fetus, were found to contain bacteria typical of *S. typhimurium*. Six of these cultures, including the two vaginal cultures and the culture from the aborted fetus, were submitted to the above mentioned laboratory where all were identified as *S. typhimurium* except one of the fecal cultures which was identified as *Salmonella oranienburg*.

Blood was drawn from several of the sheep at the same time the 36 cultures were obtained. Serological tests were negative for brucellosis, leptospirosis, and vibriosis.

Approximately 20 per cent of the sheep in the flock developed diarrhea, and approximately 5 per cent aborted. Of the ewes that developed diarrhea without aborting, only 3 (1%) died. The over-all mortality was only slightly over 5 per cent. Signs of the disease, other than abortion followed by diarrhea or diarrhea without abortion, included depression, slight elevation of temperature, and loss of appetite. The feces were black and much softer than normal, but not watery. In ewes which developed diarrhea but did not abort, recovery in five to seven days was the rule. In those which aborted and developed diarrhea, death was the rule, usually in two or three days after the diarrhea began.

SUMMARY

Paratyphoid abortion and paratyphoid dysentery occurred simultaneously in a

Drs. Vickers, Bierer, and Baker are with the Clemson College Livestock Sanitary Department, Columbia, S. Car. Dr. Atkinson is a practitioner in Kingstree; and Mr. Mudge is superintendent, Clemson College Experiment Station, Wellman Division, Johnsonville, S. Car.

The authors express their appreciation to the personnel of the Communicable Disease Center, Laboratory Branch, Chamblee, Ga., for their cooperation in identifying the bacteria.

flock of bred yearling ewes. *Salmonella typhimurium* was recovered from the spleen, vagina, and feces of affected ewes and from an aborted fetus. A limited review of the literature reveals no other report of a like nature.

References

[1]Hutyra, F., Marek, J., and Manninger, R.: Special Pathology and Therapeutics of the Diseases of Domestic Animals. Vol. 1. 5th ed. Alexander Eger, Inc., Chicago (1949): 198.

[2]Newsom, I. E.: Sheep Diseases. The Williams and Wilkins Co., Baltimore (1952): 40-43, 78.

Antibiotic from Maggots.—When the young larvae of the black blowfly, *Phormia terraenovae*, were fed raw meat, then sprayed with distilled water, the washings contained an antibiotic which was effective against several types of bacteria. Maggots have been used to cleanse wounds and were believed to have a threefold action: removal of dead tissue by enzymes, stimulation of new tissue growth, and reduction of wound infection. The latter led to the search for the antibiotic which appears to be a product of the larvae and not of microorganisms associated with them.—*Sci. News Letter (Nov. 16, 1957): 312.*

Renal Failure Following Angiography.—Temporary renal failure occurred in a woman after an intravascular injection of an organic iodide as contrast medium, the first such case in 500 aortograms performed in the diagnostic x-ray department of a London hospital in five years. From all sources, 37 cases of renal complications have been reported, seven of these were fatal and six had tubal necrosis. As a result, the dose per person has been reduced to 20 ml. of a 70 per cent solution. Occasionally, a second injection of not over 15 ml. is necessary.—*J. Am. M.A. (Nov. 9, 1957): 1349.*

Foreign Body Perforation of the Intestine.—Of 95 cases of gastrointestinal perforation in man, reported by 1941, the perforating objects were: metallic (46%); animal bones (46%); and wood splinters (9%). In a series of 766 ingestions of foreign bodies, 25 per cent lodged in the esophagus and, of those which reached the stomach, 93 per cent were passed normally, and only 0.6 per cent caused perforation. Of six perforations at one hospital in ten years, all in adults, there were four chicken bones, a pin, and a toothpick. Four of the patients had been affected with chronic intestinal obstruction (5 wore dentures).—*Am. J. Surg. (Oct., 1957): 564.*

Leptospirosis in Kenya.—For the first time, leptospirosis has been diagnosed in ruminants in East Africa. For several years, there have been uninvestigated reports of "pink milk" and jaundice in cattle, and abortions in swine. About one third of the affected cattle showed severe jaundice, lesions on the udder and teats similar to those of cows with photosensitization, bright red to colostrum-like or watery milk secretion, bright red to black urine, signs of abdominal pain, and abortion. The most consistent serological reaction was to *Leptospira grippotyphosa.*—*Kenya Ann. Rep., (1956): 23.*

Hereditary Pancreatitis in Man.—The hereditary form of chronic relapsing pancreatitis is reported in unrelated families. It is apparently transmitted as an autosomal dominant gene.—*Proc. Mayo Clinic (July 10, 1957): 354.*

Wasp Stings.—Two women who apparently had been sensitized by previous stings by wasps, resulting in fainting spells and illness, died suddenly when again stung. One was stung in a superficial vein in the arm, the other in a finger.—*Brit. Med. J. (Sept. 28, 1957): 771.*

No Urogenital Sinus in Nutria.—The female nutria has three openings in the perineal region; the urethra empties on the body surface instead of into the vagina. The vagina is a relatively long (12 cm.) and uniform tube.—*Med. Weteryn. (May, 1957): 277.*

A Radio Wave Promotes Healing.—An electronic medical device called the Bio-Cold-Ray can speed the healing of burns, ulcers, and poison ivy lesions. The radio wave (420 kc. per second) is a little below the lowest frequencies used by commerical broadcasting stations. It is not the same as short-wave diathermy. The patient holds one electrode in his hand and places the affected member between it and the machine.—*Sci. News Letter (Oct. 5, 1957): 216.*

Chlortetracycline as a Preventative of Vibrionic Abortion of Sheep

F. W. FRANK, D.V.M.; L. H. SCRIVNER, D.V.M.;
J. W. BAILEY, D.V.M.; W. A. MEINERSHAGEN, B.S.

Caldwell, Idaho

VIBRIONIC ABORTION of sheep is an acute infectious disease characterized by abortion during the last half of the gestation period. The incidence of abortion in an infected flock may range from negligible to 70 per cent. The disease is extremely sporadic. It commonly occurs in areas with no previous history of the disease. It does not usually occur in two successive years on the same premises, and does not necessarily recur in the same area.

Early workers[4,5] produced abortions in a limited number of ewes by oral inoculation with infected tissues and with pure cultures of *Vibrio fetus*. Recent research,[1,2,3] in which larger numbers of experimental animals were used, has shown that the disease is readily transmitted by oral inoculation to a high percentage of susceptible ewes in the last half of the gestation period.

Other routes of transmission of the disease have been studied extensively with essentially negative results, although some evidence has been presented that intravaginal inoculation may result in infection. *Vibrio fetus* was isolated from the aborted fetus of 1 of 22 ewes bred to rams which had been infected orally.[3] Uterine infection, but not abortion, was produced[7] in 2 of 27 ewes inoculated intravaginally at the time of breeding; 1 ewe died of unknown cause three days after inoculation and *V. fetus* was isolated from the uterus. *Vibrio fetus* was also isolated from uterine swabs made after parturition in 1 of 21 of the ewes which lambed normally.

It has been demonstrated[2,3] that ewes which abort as a result of the infection are immune for at least one year. This immunity may, in part, account for the absence of recurrence of the disease on the same premises in successive years. The knowledge that immunity results from natural infection suggests that a vaccine might be the cheapest and most effective method of prevention. However, no vaccine is available.

Field trials have been described[6] in which single injections of various antibiotics failed to alter the course of abortion outbreaks, even though normal sheep given comparable amounts of the antibiotics developed serum levels which would inhibit the organism. A possible explanation for this failure to prevent the disease, even though therapeutic blood levels were achieved, may lie in the fact that the blood levels attained were only transitory and could not be expected to be effective against subsequent exposures which might occur daily in a heavily infected flock.

As a preliminary step toward finding measures to control established field infections, this study was undertaken to determine whether the continuous feeding of chlortetracycline* to ewes in late pregnancy would prevent vibrionic abortion.

MATERIALS AND METHODS

In February, 1957, 60 yearling ewes, range-bred to start lambing on April 20, 1957, were purchased from a source believed to be free of vibriosis. These ewes were weighed, ear tagged, paint numbered, and allotted to three groups of 20 each. Each lot was separated from the next only by a woven wire fence and the animals were fed, on the ground, all the alfalfa hay they would eat. The pens were arranged so that the ewes in all lots drank from the same water tank.

On March 1, all ewes were offered an average of ½ lb. of a commercial supplement range cube, fed on the ground. Cubes for lot 1 contained no chlortetracyline; those for lot 2 supplied 80 mg. of chlortetracycline per day for each ewe; and the cubes for lot 3 supplied 420 mg. of chlortetracycline per day.

On March 6, the hay ration was reduced to 40 lb. per pen. On March 8, the ewes in lot 3 began eating the allotted amount of pellets and the hay ration was gradually increased. It was necessary throughout the experiment to limit the amount of hay in order to force the ewes in lot 3 to eat the cubes.

From the Department of Veterinary Science (Scrivner, Bailey) and the Caldwell Branch Station (Frank, Meinershagen), Idaho Agricultural Experiment Station, Caldwell.

Published with the approval of the director of the Idaho Agricultural Experiment Station as paper No. 438.

Financial assistance for this study was furnished by a grant-in-aid from the American Cyanamid Company, Pearl River, N. Y.

*Aureomycin in the form of Aurofac-10, trade name of the American Cyanamid Company, Pearl River, N. Y.

TABLE 1—Results of Feeding Chlortetracycline to Ewes Experimentally Infected with Vibrio Fetus-Infected Tissues

Lot	No. pregnant ewes	Normal lambings	Abortions	V. fetus isolated	Incubation period (days)
1 (Control)	18	7	11 (61%*)	11	8, 9, 10, 10, 11, 11, 12, 17, 19, 22, 48
2	17	14	3 (18%)	2	30, 31, 35
3	20	18	2 (10%)	2	19, 22

*Percentages based on the number of pregnant ewes only.

On March 12, all ewes in all lots were inoculated orally with 2 oz. of a suspension of *V. fetus*-infected tissues. The suspension was prepared from fetal membranes, stomach contents, and livers of 6 aborted lambs, from which *V. fetus* had been isolated. The same suspension was used for all of the ewes. The amount of suspension which was not used (approx. 1 qt.) was mixed with the water in the common watering trough.

All ewes were closely observed to determine if they were eating the treated feed, to detect any signs attributable to it, and also to detect signs of impending abortion. Following abortions, no attempt was made to clean or disinfect the premises, and aborting ewes were left in the pen to increase the source of infection.

Tissues from all aborted fetuses were cultured on blood agar for *V. fetus*. Each *V. fetus* isolate was checked for sensitivity to chlortetracycline (10-μg. discs). All isolates were sensitive to this antibiotic.

RESULTS

The results of feeding chlortetracycline to ewes as a preventative of vibrionic abortion are summarized (table 1).

Chi-square statistical analysis revealed that the difference in numbers of abortions between lot 1 and lots 2 and 3 combined was highly significant ($P<0.01$). The difference in numbers of abortions between the two treated groups (lots 2 and 3) was not significant ($P\cong0.50$).

No signs (e.g., digestive disturbances) attributable to the chlortetracycline were observed. Two ewes in lot 2 did not eat the treated feed for several days after inoculation; 1 was among the 3 which aborted and the other was barren. One ewe in lot 3 did not eat the treated feed for four days after inoculation; she was 1 of the 2 which aborted.

The amount of chlortetracycline consumed varied, since some ewes ate more of the treated feed than did others.

On May 1, samples of untreated and treated feeds and of the drug used were analyzed for antibiotic activity (table 2).*

*Courtesy of American Cyanamid Company. A sample of the Aurofac-10 used assayed 10.8 Gm. chlortetracycline activity per pound.

TABLE 2—Computed vs. Assayed Amounts of Chlortetracycline Per Pound of Feeds Used

	Chlortetracycline (mg.)	
	Computed	Actual
Lot 1	0	0
Lot 2	160	103
Lot 3	840	664

It appeared from this assay that the antibiotic activity of the feeds was less than expected (table 3). Although the assays were performed 60 days after mixing, the available information regarding stability in pelleted feeds suggests that the lower chlortetracycline activity resulted from mixing and pelleting, and that the ewes actually received the lower levels throughout the experiment.

DISCUSSION

The incubation periods recorded may be misleading. Since the ewes were maintained in groups, it is possible that later abortions resulted from exposure to ewes aborting early and not from the initial inoculation. The apparent increase in the incubation period for the treated lots (2 and 3) may be of importance, since infected ewes which complete the gestation period often give birth to living lambs, many of which will survive. In the natural occurring disease, an extended incubation time at the end of the gestation period could result in the birth of living lambs.

Three anomalous lambs were born at term in lot 2, 1 each a so-called "hairy lamb," "pot-bellied lamb," and "crazy lamb." These conditions are rather common in Idaho sheep. Careful necropsy of the lambs in each case revealed lesions characteristic of the particular condition, and

TABLE 3—Computed vs. Assayed Amounts of Chlortetracycline Provided Daily for the Treated Ewes

	Av. ewe wt. (lb.)	Average mg. chlortetracycline			
		Per ewe		Per lb. body wt.	
		Computed	Actual	Computed	Actual
Lot 1	114.3	0	0	0	0.
Lot 2	112.5	80.0	51.5	0.71	0.45
Lot 3	114.3	420.0	332.0	3.7	2.9

cultures from the lambs and their dams were negative. These were not considered as abortions in compiling the data. Further experimentation to more closely determine the antibiotic intake and the necessary length of the feeding period to obtain similar results is indicated.

SUMMARY

In an experiment to determine the value of chlortetracycline (Aurofac-10) as a preventative for vibrionic abortion in sheep, 60 ewes were allotted to three groups of 20 each and inoculated with *Vibrio fetus*-infective tissues. Twelve days earlier, ewes in two of the lots had been placed continuously on feed containing different levels of the antibiotic, computed as a daily average of 0.71 mg. per pound of body weight in lot 2 and 3.7 mg. per pound in lot 3.

The actual levels which each ewe received daily, as revealed by assays of the treated feeds, was 0.45 mg. per pound of body weight in lot 2 and 2.9 mg. per pound in lot 3.

Eleven abortions occurred among 18 untreated pregnant ewes in lot 1 (61%), three abortions occurred among 17 pregnant ewes in lot 2 (18%), and two abortions occurred among 20 pregnant ewes in lot 3 (10%). Statistically, both levels of chlortetracycline, when fed continuously, resulted in a highly significant reduction in the abortion rate due to vibrionic infection.

References

[1]Frank, F. W., and Bailey, J. W.: Experimental Oral Transmission of Vibrionic Abortion of Sheep. J.A.V.M.A., *131*, (Nov. 15, 1957): 472-473.

[2]Frank, F. W., Scrivner, L. H., Bailey, J. W., and Meinershagen, W. A.: Unpublished data, Idaho Agricultural Experiment Station, Caldwell, Idaho.

[3]Jensen, Rue, Miller, V. A., Hammarlund, M. A., and Graham, W. R.: Vibrionic Abortion in Sheep. 1. Transmission and Immunity. Am. J. Vet. Res., *18*, (1957): 326-329.

[4]Lee, A. M., and Scrivner, L. H.: Experimental Work Upon Recent Outbreaks of Abortion in Ewes. Am. J. Vet. Res., *2*, (1941): 50-54.

[5]McFadyean, J., and Stockman, S.: A Report of the Department Committee Appointed by the Board of Agriculture and Fisheries to Inquire Into Epizootic Abortion. Part III and Appendix to Part III, Abortion in Sheep. Wyman and Sons, Ltd., London, 1913.

[6]Ryff, J. F., and Breen, Harold: *In Vivo* and *in Vitro* Use of Antibiotics Against *Vibrio fetus*. J.A.V.M.A., *128*, (1956): 521-523.

[7]Tunnicliff, E. A., Marsh, H., and Firehammer, B. D.: Unpublished data. Vet. Res. Lab., Montana State College, Bozeman, 1954.

[8]Tucker, J. O., and Roberstad, G. W.: Experimental Vibriosis in Sheep. Unpublished data, Dept. of Veterinary Science, University of Wyoming, Laramie, 1955.

Chlorpromazine in Swine Practice.—Chlorpromazine, in 5 per cent solution, was injected intravenously (0.55 to 3.3 mg./-kg.) in 22 swine weighing from 30 to 480 lb., and intramuscularly (2.0 to 4.4 mg./-kg.) in 8 swine weighing 100 to 700 lb. There were no indications of pain or irritation at the injection site.

When given intravenously, the squealing usually ceased before the injection was completed and, when released, the animal appeared dazed, its respiratory rate was increased for about 15 minutes, and it became progressively narcotized. If undisturbed, it would pass into a deep sleep but could be aroused by vigorous stimuli.

When given intramuscularly, the effect was less marked, with little change in the respiratory rate, and a temperature drop of about 2.4 degrees (F.) in 30 to 40 minutes (less than when given intravenously).

When given intravenously, animals usually became docile and local anesthetics could be injected, except in the scrotum, and surgery performed without restraint. However, the effect varied unpredictably. When given intramuscularly to several large vicious boars, the effects were not visible except that the boars seemed more docile when approached.—*H. E. Ritchie in Vet. Rec. (Sept. 21, 1957)*: *895.*

Epiphyseal Bone Growth.—In man, the ability to accelerate or retard epiphyseal growth in a bone is of practical importance where poliomyelitis, bone tuberculosis, or osteomyelitis have affected the length of one leg. Growth can be retarded or even prevented in the normal bone by compressing the epiphysis against the diaphysis with strong staples through the edge of the epiphyseal bone. It is usually preferable but more difficult to stimulate growth in the abnormal bone. This can be done, as may happen in osteomyelitis where new bone obstructs the major blood vessels, by reducing circulation to the shaft, resulting in increased circulation and growth at the extremities of the bone.—*Brit. Med. J. (Oct. 26, 1957)*: *992.*

Prednisone (Meticorten) as Supportive Therapy in Stress Conditions in Large Animals

WILLIAM W. BAILEY, D.V.M.

Sussex, New Jersey

IN A PREDOMINANTLY large animal practice, I have used prednisone (Meticorten*) as supportive therapy, with good results, in a wide variety of conditions. The common denominator in these conditions was stress, with its varied end effects.

While the term "stress" is of fairly recent origin, the concept was well understood by many early investigators. The term "homeostasis" was introduced in 1922[2] to designate the maintenance of the stability in normal body states, and a number of specific reactions which are important in maintaining homeostasis during such activities as muscular work, nervous irritation, and temperature changes, were examined. In 1932, experiments with purified adrenal cortical extracts led to the "general tissue hormone" theory of the corticoids.[1] It was concluded that cortical hormone is necessary for the function of all cells because it raises the resistance of tissues to infection, combats fatigue of muscles and nerves, and maintains the normal temperature and hydration of tissues.

In 1934, a French surgeon described a condition accompanied by characteristic blood-chemical changes following all kinds of severe surgical intervention[3] and named it "maladie postoperative."

However, it remained for Selye[10] to develop the concept of stress and its inter-relationship as we know it today. In 1936, he observed that animals exposed to a variety of nonspecific damaging agents responded with a discharge of adrenal cortical hormones, and simultaneously their resistance to numerous damaging agents was increased. The most striking feature of the response was its extreme nonspecificity.[5] Any stress was apparently met by an increased discharge of corticoids.

In 1937, it was demonstrated that, following hypophysectomy, the animal was no longer capable of responding with any adrenocortical secretion, even when exposed to severe, lethal stress.[11] At the same time, the resistance of these hypophysectomized animals fell to low levels. It was concluded that exposure to stress normally causes both damage (shock) and defense (counter-shock) phenomena.

In the absence of pituitary secretion, the manifestations of damage (hypothermia, hypoglycemia, etc.) are more pronounced, while the defense changes (e.g., hyperglycemia, dissolution of lymphatic tissue, etc.) are eliminated. Thus it seemed that a promising way to treat the stress factor of disease would be to imitate the physiological counter-shock phenomenon by administering exogenous ACTH or corticoids as required. By supplementing the natural systemic defense reaction and the usual means of combating pathogenic conditions (surgery, drugs, etc.), the simultaneous administration of adrenal cortical steroids might render the body indifferent, or at least more resistant, to the damaging actions of these pathogenic agents. The theory of the general adaptation syndrome (GAS) and of the diseases of adaptation followed.[10,10]

GENERAL ADAPTATION SYNDROME

The general adaptation syndrome evolves in three successive stages: the alarm reaction; resistance; and exhaustion.

Alarm Reaction.—The alarm reaction, the sum of all nonspecific phenomena elicited by sudden exposure to stimuli, affects large portions of the body. Some of the resulting changes are passive and represent signs of damage or shock, others show active defense against damage. The shock phase in the alarm reaction may be characterized by such changes as depression; a decrease in temperature, vascular tension, and muscular tone; blood concentration, deranged capillary and cell membrane permeability; and by hypochloremia, acidosis, fall in blood sugar, leukopenia followed by leukocytosis, eosinopenia, and acute gastrointestinal erosion.

Shock may be considered a condition of suddenly developing systemic damage. The phase of counter-shock, in the alarm reaction, is characterized by mobilization of defense against shock, such as enlargement of the adrenal cortex with increased secretory activity. In general, there is a reversal of most of the changes of the shock phase, including a rise in blood pressure, hyperchloremia, hyperglycemia, rise in blood volume, alkalosis, and increased diuresis. These changes are largely dependent upon the discharge of corticoids into the blood stream. The counter-shock phase represents a transition to the second stage of the GAS, the stage of resistance. In the event of chronic stress, the transition is imperceptible.

Dr. Bailey is a general practitioner in Sussex, N. J.

The author appreciates the assistance of W. G. Robertson, Ph.D., in preparing this paper.

*Meticorten is produced by Schering Corp., Bloomfield, N.J.

Resistance Stage.— The stage of resistance represents the sum of all nonspecific, systemic reactions to prolonged exposure to stimuli. The body develops an increased resistance to the particular stress or agent to which it has been exposed and, at the same time, a decreased resistance to other stimuli. This occurs in secondary or complicated ketosis. As the animal becomes adapted to ketosis, it becomes more susceptible to the complicating factors and the clinical signs become more aggravated. Treatment with prednisone alone results in relapses or limited response. Until the complication is successfully diagnosed and treated, the prognosis is poor.

Exhaustion Stage.—The final stage in the GAS represents the sum of all the nonspecific systemic reactions which result from prolonged overexposure to stimuli to which adaptation has been developed but could no longer be maintained. It has been shown[10] that, if exposure to abnormal conditions continues long enough, adaptation wears out and many lesions characteristic of the alarm reaction reappear and further resistance becomes impossible. Fortunately, in a large animal practice one seldom sees the stage of exhaustion.

ANIMALS' RESPONSE TO STRESS

One of the most characteristic responses to stress is increased adrenal cortical activity. Under experimental conditions in small animals, this is shown by adrenal hypertrophy, ascorbic acid and lipid depletion of the cortex, thymus involution, eosinopenia, and many other characteristics directly attributable to increased adrenal cortical secretion. More difficulty was encountered in obtaining direct evidence of adrenal cortical activity in man and in large animals.

A method was perfected[9] for the determination of 17-hydroxycorticosterone (compound "F," hydrocortisone) in human beings. They uniformly responded to stress with increased circulating levels of this material.[3-6] Since this method was not applicable for the determination of hydrocortisone in the blood of cattle, another method was developed,[14] so it is now possible to determine the circulating level of an adrenal steroid—the major glucocorticoid in cattle—and to gain evidence as to the activity of the adrenal cortex under various conditions. A study which determined the response of the adrenal cortex of dairy cattle to various acute illnesses has been reported.[12]

Hydrocortisone levels in cows were determined from samples of jugular vein blood drawn prior to any treatment, but only on animals with acute illness. It is evident (table 1) that a wide variety of acute illnesses produce an elevation in the plasma hydrocortisone levels. Little, if any, disturbance was found in the plasma protein-bound levels, but some of the animals subjected to stress had abnormally high acetone levels in the blood. There was also an increase in blood sugar in some animals, probably as a result of the increased steroid level in the blood.

When the mean plasma 17-hydroxycorticosteroid level of 20 normal dairy cows (4.58 μg./100 cc.) is compared with that of 21 dairy cows (table 1) subjected to stress (11.95 μg./100 cc.), the difference is highly significant.

THERAPEUTIC EFFECTIVENESS OF STEROIDS

It seemed that increased hydrocortisone levels were always present in acutely ill animals, but further clinical evidence was needed to determine the therapeutic effectiveness of the steroids under general practice conditions. With this in mind, a number of different disease conditions in dairy cattle were examined.

Ketosis.—This condition represents another manifestation of the stress mechanism. While certain endocrine disturbances are prominent, once clinical signs are present, the primary causes may depend on nutritional or management factors.

Blood levels of 17-hydroxycorticosteroid were found to be above normal in cows with ketosis.[13] Liver function in these animals was shown to be deficient.[11] In this instance, a steroid is indicated as well as the supportive therapy.

I have treated, successfully, well over 200 ketotic animals with steroids—the majority with prednisone. A considerable range of dosages has been investigated and success was obtained with 100 mg. given intramuscularly.[1]

The complicated cases are more difficult to manage, particularly those in which the secondary complications are obscure. For example, when cows with ketosis relapsed after a dose of steroid which had previously been adequate, closer examination resulted in a tentative diagnosis of a complicating minor urinary tract infection. The

addition of penicillin to the steroid treatment eliminated the problem. In stubborn cases of ketosis, in herds on a high plane of nutrition and management, the addition of vitamins and minerals has often aided recovery.

Surgery.—Major surgical interventions and the resulting trauma impose additional stress in a condition which in itself induces a severe stress. Recovery following operations of this type formerly took about three days, as indicated by the appetite and milk production. When prednisone is given, recovery often occurs in 24 hours. The use of 100 mg. of the drug intramuscularly, following surgery in dairy animals for conditions such as traumatic gastritis, appears adequate. The intravenous administration of 50 mg. prior to surgery, with 50 mg. intramuscularly following surgery, might be a better approach.

Prolapse of Uterus.—In a large animal practice, prolapse of the uterus is not common but the severity of the condition can not be minimized. The immediate problem may be the prevention or reversal of shock which, prior to the advent of the glucocorticoids, was the primary cause of death. A typical example occurred in a cow within an hour after the prolapse occurred. The animal was in a severe state of shock as evidenced by slow, weak pulse, difficult respiration, subnormal temperature, eyes rolling and glazed, and weakness. She responded to epinephrine but relapse occurred before the uterus could be replaced and she died. Recently, in a similar case the intravenous and intramuscular administration of a total of 200 mg. of prednisone, plus the replacement of the uterus, resulted in complete recovery. The animal probably would have died without this therapy.

Septic Metritis.—This acute, debilitating condition, in which the cow has a poor appetite, a high temperature, and her milk production drops, is seen frequently. Recovery usually follows uterine medication and systemic antibiotics or sulfonamide therapy when the cow is treated soon enough. However, when the animal is neglected, the mortality may be high and those that do recover may require extensive treatment. Prednisone (100 mg.), intramuscularly, in such cases has been of considerable benefit and has reduced the recovery time. In addition, the anti-inflammatory activity of the steroid is beneficial and, since using it as supportive therapy, all cows I have treated for uterine prolapse have recovered. Recently, in treating this condition, I have used prednisone

TABLE 1—Results of Acute Stress Conditions in Dairy Cattle

Cow (No.)	Veterinarian's diagnosis	Blood glucose (mg./100 cc.)	Blood acetone (mg./100 cc.)	Plasma PBI (μg./100 cc.)	Plasma 17-OH-CS (μg./100 cc.)
1	Acute mastitis (105.6 F.)	62.3	3.18	4.96	12.34
2	Acute mastitis, scours (105 F.)	51.1	3.74	4.27	15.55
3	Traumatic gastritis, mastitis (106 F.)	47.1	3.57	4.31	9.47
4	Acute mastitis, (106 F.)	65.3	Normal	2.83	11.14
5	Acute mastitis (106 F.)	30.3	Normal	1.60	17.24
6	Acute mastitis (104.6 F.)	41.8	Normal	4.04	10.65
7	Parturient paresis	63.5	2.25	4.66	8.75
8	Parturient paresis	43.2	Normal	2.14	8.56
9	Parturient paresis	60.4	Normal	2.34	9.41
10	Retained fetal membrane, nephritis, metritis	46.1	4.32	3.91	18.29
11	Retained membrane, pyelonephritis	43.6	5.73	2.55	12.39
12	Retained membrane, metritis, mastitis (104 F.)	----	Normal	1.98	6.58
13	Retained membrane, metritis	42.7	Normal	3.53	6.60
14	Retained membrane	----	Normal	1.65	7.86
15	Metritis, toxemia	42.8	Normal	8.92	14.21
16	Complete uterine prolapses	46.2	2.13	2.01	13.09
17	Traumatic gastritis (rumenotomy)	51.1	1.35	4.42	13.58
18	Traumatic gastritis (rumenotomy)	66.5	2.97	9.19	17.84
19	Traumatic gastritis (rumenotomy)	46.5	Normal	2.38	7.01
20	Traumatic gastritis (rumenotomy)	58.3	2.96	5.36	8.67
21	Encephalitis	39.4	11.65	2.87	21.78
Mean		49.9	3.99	3.63	11.95

(100 mg.) and penicillin (3 million units), plus uterine medication with good results.

Mastitis.—Cows with acute mastitis, with a high temperature, swelling of the udder, anorexia, and decreased production have long presented a problem, particularly if therapy is delayed. The best treatment was rarely satisfactory, as the return to normal production was often slow. I have used prednisone (100 to 200 mg., intramuscularly) as supportive therapy in many of these cows. The benefits are shown by a rapid reduction of swelling, reduced fever, and a rapid return to normal appetite. The systemic steroid seems to make the antibiotic infusion in the udder more effective.

Parturient Paresis.—Prednisone seems to be of some benefit for cows with parturient paresis when used as supportive therapy, along with the usual treatment. With few exceptions, when it has been used in the initial treatment of cows with a history of relapses, these have not occurred. The dosage has ranged from 100 to 200 mg., intramuscularly. The mode of action of the steroid in this instance is obscure.

Arthritis.—Another condition that has been observed with considerable interest is severe arthritic involvement of the hock joints, particularly with extensive swelling of the tibial and metatarsal regions. These animals show definite signs of pain, and a decrease in milk flow, appetite, and weight if the condition persists. Definite benefits have been derived from the intramuscular administration of 150 to 200 mg. of the steroid. In 24 hours, the swelling is noticeably reduced and the appetite is appreciably improved and, in 48 hours, the animal is normal or nearly so. The effectiveness of these steroids in arthritic conditions is well known but, in addition, there is alleviation of considerable stress. As with severe cases of foot rot, the administration of 100 mg. of prednisone intramuscularly, plus antibiotic or sulfonamide therapy, has been followed by marked improvement. In both of these conditions, the animal is apparently suffering from stress as well as from the severe inflammatory condition.

SUMMARY

Prednisone (Meticorten) has been beneficial when used as either supportive or primary therapy in trauma, shock, parturient paresis, severe foot rot, severe arthritic involvements, ketosis, systemic infections, and inflammatory conditions. This steroid is not a "cure-all" but it seems to have a definite place in veterinary medicine.

References

[1]Bailey, W. W., and Robertson, W. G.: Adrenal Steroids in Veterinary Medicine. Paper presented at the annual meeting of the New Jersey Veterinary Medical Association, 1956.

[2]Cannon, W. B.: New Evidence for Sympathetic Control of Some Internal Secretions. Am. J. Psychiat., *2,* (1922): 15.

[3]Daughaday, W. H., Jaffe, H., and Williams, R. H.: Adrenal Cortical Hormone Excretion in Endocrine and Nonendocrine Disease as Measured by Chemical Assay. J. Clin. Endocrinol., *8,* (1948): 244.

[4]Forbes, A. P., Donaldson, E. C., Reifenstein, E. C., and Albright, F.: The Effect of Trauma and Disease on the Urinary 17-Ketosteroid Excretion in Man. J. Clin. Endocrinol., *7,* (1947): 264.

[5]Franksson, D., Gemzell, C. A., and von Euber, U. S.: Cortical and Medullary Adrenal Activity in Surgical and Allied Conditions. J. Clin. Endocrinol. and Metab., *14,* (1954): 608.

[6]Gemzell, C. A.: Blood Levels of 17-OH-CS in Normal Pregnancy. J. Clin. Endocrinol. and Met., *13,* (1953): 941.

[7]Hartman, F. A., Brownell, K. A., and Lockwood, J. E.: Cortin as a General Tissue Hormone. Am. J. Physiol., *101,* (1932): 50.

[8]Leriche, R.: La Maladie Postoperatoire. Lyon Chir., 8 Mars, (1934): 627 (Canad. M.A.J., 43, (1940): 1).

[9]Nelson, D. H.: A Method for the Determination of 17-Hydroxycorticosteroids in Blood: 17-Hydroxycorticosterone in the Peripheral Circulation. J. Clin. Endocrinol. and Met., *12,* (1952): 519.

[10]Reynolds, O. E., and Phillips, N. E.: Adaptation of the Albino Rat to Discontinuous Chronic Exposure to Altitude Anoxia. Am. J. Physiol., *151,* (1947): 147.

[11]Robertson, W. G., and Bailey, W. W.: Liver Function in Ketotic Cows. J. Dai. Sci. In Press.

[12]Robertson, W. G., Lennon, H. D., Jr., Bailey, W. W., and Mixner, J. P.: The Effect of Certain Acute Stress Conditions on the Plasma Levels of 17-Hydroxycorticosteroids and Protein-Bound Iodine in Dairy Cattle. J. Anim. Sci., *14,* (1955): 1253.

[13]Robertson, W. G., Lennon, H. D., Jr., and Mixner, J. P.: Interrelationships Among Plasma 17-Hydroxycorticosteroid Levels, Plasma Protein-Bound Iodine Levels and Ketosis in Dairy Cattle. J. Dai. Sci., *38,* (1955): 611.

[14]Robertson, W. G., and Mixner, J. P.: A Method for the Extraction, Purification and Chemical Assay of 17-Hydroxycorticosteroids in Blood of Cattle. J. Anim. Sci., *13,* (1954): 1030.

[15]Selye, H., Dosne, D., Bassett, L., and Whitaker, J.: On the Therapeutic Value of Adrenal Cortical Hormones in Traumatic Shock and Allied Conditions. Canad. M. A. J., *43,* (1940): 1.

[16]Selye, H.: Stress. Acta Inc., Montreal, 1950.

[17]Selye, H.: Studies on Adaptation. Endocrinology, *21,* (1937): 169.

[18]Selye, H.: A Syndrome Produced by Diverse Nocuous Agents. Nature, *138,* (1936): 32.

[19]Selye, H.: Textbook of Endocrinology. 2nd ed. Acta Endocrinologica, Montreal, 1949.

Distemper in Raccoons and Foxes Suspected of Having Rabies

ROBERT T. HABERMANN, D.V.M.; CARLTON M. HERMAN, Sc.D.; FLETCHER P. WILLIAMS, Jr., B.S.

Bethesda, Maryland

THE FIRST RECENT report of an epizootic of distemper in raccoons was made, in 1955,[7] in Kansas. The disease was characterized by loss of aggressiveness, exudate on the eyes and nose, encephalitis, and diarrhea. Two other strains of distemper-like viruses were isolated from sick raccoons,[6] one from Maryland and the other from Pennsylvania. These two strains were shown to belong to the canine distemper virus complex, by clinical and histopathological findings and cross-immunity tests. A report from Missouri[10] stated that veterinarians there had reported distemper in raccoons which was identical to that found in dogs, and that successful inoculations had been made in both species.

There is an unpublished report[1] of distemper virus being isolated from a sick raccoon from Wisconsin in February, 1954. A tenfold dilution of spleen and lung emulsion from the raccoon caused death in ferrets in ten days, and the virus produced typical inclusion bodies in the original raccoon and in inoculated ferrets. The virus was passed from spleen and lung emulsion of ferrets onto chorioallantoic membranes of 8-day chicken embryos; on the twenty-second passage, the virus was inocuous for ferrets and mink but these animals were later immune when challenged with virulent distemper virus. The virus recovered from the spleen and lung emulsion from inoculated ferrets was lethal for ferrets after storage for one year at 17 C.

It was reported[4] that unusually bold or shy behavior in wild foxes, raccoons, and skunks, which was characteristic of rabies, could also be indicative of distemper. Of 35 captured rabies-suspected animals from Connecticut found to be rabies-negative by hippocampal smears and mouse inoculation tests, 20 were shown, by ferret inoculation and by histological evidence of intracytoplasmic and intranuclear inclusion bodies in the urinary tracts, to be infected with distemper virus. The other 15 were believed to have distemper because of clinical findings suggestive of this disease and the absence of laboratory evidence of rabies virus.

In 1956, distemper was reported[8] in 24 of 32 sick or dead raccoons from 18 counties in northwestern Indiana.

This paper is a report on the occurrence of distemper in raccoons and foxes captured, except for 2 animals, in Maryland from October, 1952, to January, 1957.

MATERIALS AND METHODS

Fifteen raccoons (*Procyon lotor*) and 3 red foxes (*Vulpes fulva*) were brought to the National Institutes of Health by officers of the Maryland Game and Inland Fish Commission; 3 other raccoons that were sick and easily captured came from near Bethesda; 1 raccoon had been hit by a car; 1 sick raccoon was obtained from Pennsylvania. The formalin-fixed tissues of 1 sick raccoon were sent from Kansas.

Living animals were euthanatized with chloroform or ether and, in most cases, sections of the brain, heart, lungs, kidney, urinary bladder, digestive glands and organs, spleen and lymph nodes were fixed in 10.0 per cent neutral formalin. Portions of the hippocampi of 19 of the animals were frozen and sent to a laboratory* for the mouse rabies test. Tissues were embedded in paraffin and stained by hematoxylin-eosin. Other stains such as Schleifstein, Giemsa, periodic acid-Schiff, and Masson's trichrome were employed in selected cases. Gross parasitological examinations and fecal examination, by the salt flotation centrifugation method, were conducted on some animals. No bacterial examinations were made. Specimens from animals obtained during early stages of these studies were subjected to tests for bilirubin and Leptospira.[5]

RESULTS

The pertinent results of the gross and microscopic findings in 21 raccoons and 3 foxes are discussed.

Results in Raccoons.—Nine raccoons had lesions of the brain, 5 animals showed encrustations on the eyes and nose, 4 had enteritis, 1 showed consolidation of the lung,

From the office of the associate director in charge of research, Comparative Pathology Section, National Cancer Institute, National Institutes of Health, Bethesda, Md. Mr. Herman is with the Patuxent Research Refuge, U.S. Fish and Wildlife Service, Laurel, Md.

*Laboratory of Infectious Diseases, National Institutes of Health, Bethesda, Md.

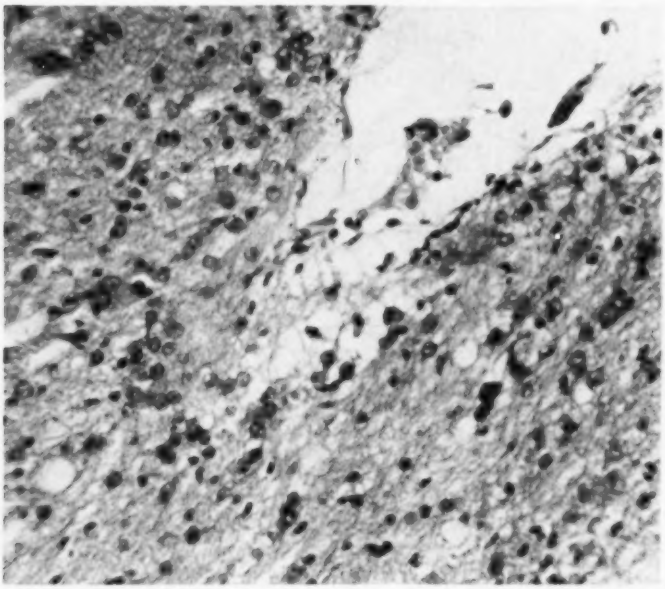


Fig. 1—Section of cerebrum of a raccoon showing submeningeal necrosis and loss of substance. H & E stain; x 140.

1 was paralyzed, 1 had gastritis, and 6 showed no significant lesions. The microscopic findings in 14 raccoons were similar to the lesions described[2,3] for canine distemper, and the most constant histological feature was the presence of inclusion bodies. The histopathological changes in the different sites in the brain consisted of loss of substance, scuffed or washed out appearance, necrosis of neurons, loss of Nissl's substance, neuronophagia, and the occurrence of intranuclear inclusions in the glial cells (fig. 1); also, small hemorrhages or areas of hyperemia, perivascular cuffing and necrosis, but little, if any, infiltration of inflammatory cells. The lesions were frequently submeningeal and often near the sulci in the cerebrum, cerebellum, and occasionally in the medulla. Intranuclear inclusion bodies in glial cells were also seen in lesions in second and third layers of the cerebrum, subependymal areas of the lateral and third and fourth ventricles, in the hippocampus, and in the cervical cord in 1 animal. The lesions in the spinal cord were at the junction of the gray and white matter of the ventral horn (fig. 2).

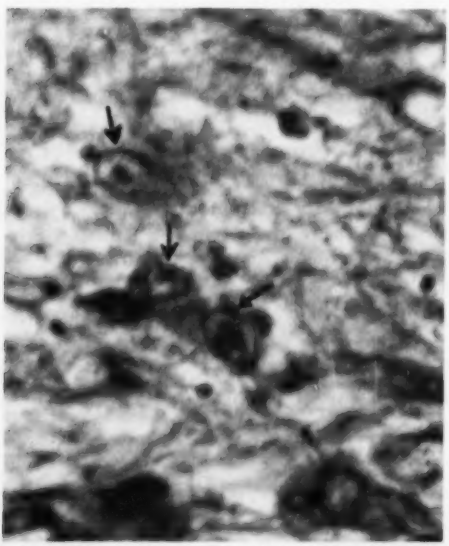


Fig. 2—Section of cervical cord of a raccoon showing intranuclear inclusions (arrows) in glial cells in the ventral horn. H & E stain; x 1,400.

The number of raccoons with intracytoplasmic and intranuclear inclusion bodies and their different locations in the brain and in the organs of the thoracic and abdominal cavities are shown (table 1). Intranuclear inclusions were seen in glial cells in submeningeal areas of the cerebrum in 10 animals, in the cerebellum of

4 animals, and in the medulla of 2 animals. The highest occurrence of intracytoplasmic inclusion bodies was in the epithelial cells of the bronchi (4 animals) and of the bile ducts (4 animals) (fig. 3) and in the urinary bladder epithelium in 2. Inclusion bodies were seen in 2 animals in the brain only, in 1 animal in bronchi and bile ducts only, and in 2 animals in the bile ducts only. In 9 animals, they were seen in the brain and in the thoracic and abdominal organs. In 1 animal, intracytoplasmic and intranuclear inclusion bodies were seen in the surface mucosal epithelium cells and in the gastric gland epithelial cells of the stomach (fig. 4); and in the surface and mucous gland epithelial cells of the colon (fig. 5) in another animal.

Although viruses of other infections may have been present in some of these animals, it appears from the clinical histories and the location and character of the lesions that strains of virus of raccoon distemper were the main pathogenic agents in 14 of these raccoons. Negri bodies were not found in the hippocampus of any of the animals.

Results in Foxes.—Fox 2428 attacked a farmer who killed it. Fox 2474 was also killed by a farmer who suspected rabies. Neither fox showed evidence of rabies on the mouse test. On histological examination of tissues, no significant lesions of rabies, distemper, or other diseases were seen. However, the absence of inclusion bodies or of encephalitis does not preclude a diagnosis of distemper,[4] and the exclusion of rabies more firmly suggests the diagnosis of distemper.

Fox 2483 was a trapped, pregnant animal in poor condition. There was no gross or microscopic evidence of disease, she had shown no abnormal behavior, and the mouse test for rabies was negative. She was parasitized with Physaloptera spp., Ascarides spp., and Acanthocephala spp., which was probably responsible for her poor condition.

TABLE 1—Incidence, Location, and Type of Inclusion Bodies in 14 Raccoons

Organ	Intracytoplasmic	Intranuclear
Cerebrum	0	10
Third ventricle	0	5
Hippocampus	0	3
Cerebellum	0	4
Medulla	0	2
Fourth ventricle	0	1
Spinal cord C_1	0	1
Bronchi	4	2
Salivary gland	2	2
Bile duct	4	0
Lymph nodes	0	3
Spleen	0	2
Bladder	2	0
Stomach	1	1
Colon	1	1
Adrenal	0	1

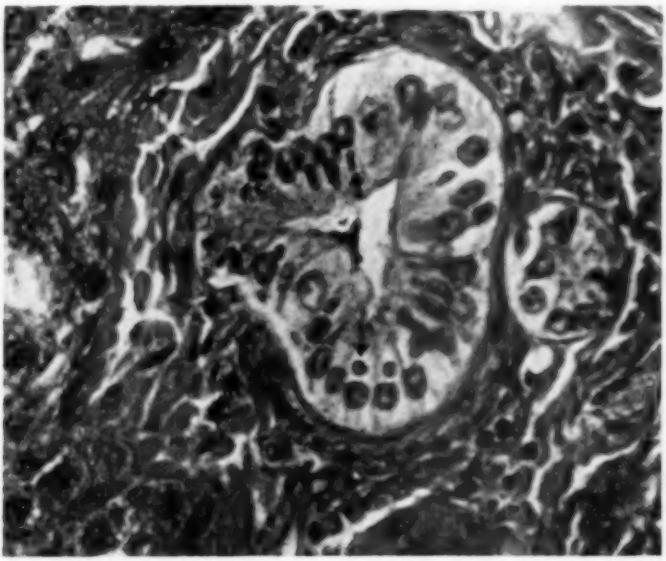


Fig. 3—Section of liver of a raccoon showing intracytoplasmic inclusions (arrows) in the bile duct epithelium. H & E stain; x 785.

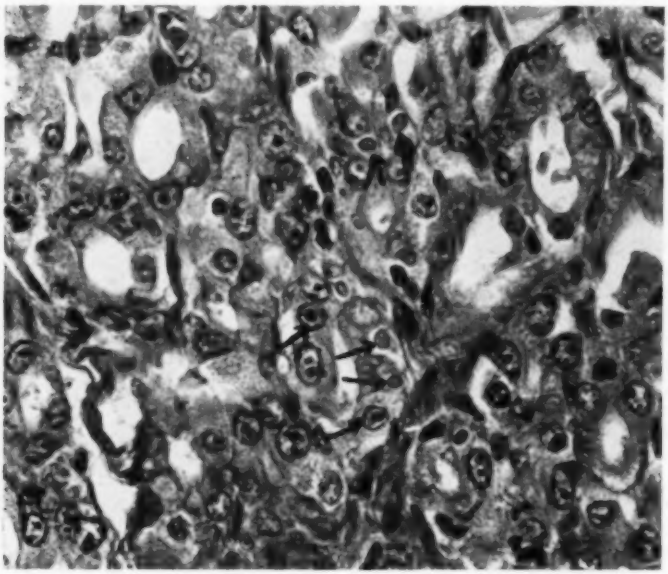


Fig. 4—Section of stomach of a raccoon showing intranuclear and cytoplasmic inclusions (arrows) in the glandular epithelial cells. H & E stain; x 1,000.

OTHER FINDINGS

Leishmaniasis caused by *Trypanosoma cruzi* was diagnosed in 1 trapped raccoon in 1955. There were no significant lesions at necropsy but, microscopically, the spleen showed numerous oval organisms 2 to 3 μ in diameter in the cytoplasm of the recticuloendothelial cells and macrophages, and in masses in smooth muscle cells of the trabeculae. Leishmania in raccoons had been previously reported in this area.[11]

Fig. 5—Section of colon of a raccoon showing intranuclear and cytoplasmic inclusions (arrows) in the mucous glands. H & E stain; x 160.

Sarcosporidiosis was seen in skeletal muscle sections from 4 raccoons and there was no evidence of any cellular reaction to the sarcocysts.

Parasitism was considered the cause of death in 2 raccoons. One was lightly infested with ticks (probably *Dermacentor variabilis*), while many Physoloptera spp. were recovered from the stomach, and many Ascaridia sp. and Taenia spp. from the small intestines. Numerous pancreatic flukes, *Eurytrema procyonis*, which has been reported to be injurious,[5,10] were recovered from the second raccoon. One raccoon apparently died of gastritis. Stomach sections showed a fistulous tract extending from the submucosa to the lumen, and scattered small abcesses in the submucosa containing clumps of gram-positive cocci. One animal died of bronchial pneumonia, another from a car injury, and 1 showed no significant lesions.

DISCUSSION

Three epizootics of suspected rabies in raccoons and one in foxes have been studied: one in raccoons in Kansas,[7] one in foxes and raccoons in Connecticut,[4] and this report in Maryland. Distemper in raccoons has also been reported from Iowa,

Wisconsin, Maine,[12] Missouri,[10] and Indiana.[8] The signs of the disease are often vague but suggest rabies because of changes in behavior. In the Kansas epizootic, the raccoons were reported to be inactive, showed no fight, had swollen eyelids, ocular and nasal discharge, diarrhea, and signs indicating central nervous system damage.[7] Two Connecticut raccoons were definitely aggressive; 1 attacked a man, a second attacked a dog chained in a barn.[4]

In each epizootic, evidence of the distemper virus but not of rabies virus was found. Aggressiveness and unusually bold behavior of naturally shy wild animals characterizes rabies,[9] and may also characterize distemper when it affects the central nervous system in raccoons and foxes.

Whenever a person is attacked by a wild animal, rabies should be eliminated from the diagnosis by mouse test before preventive treatments are discontinued. However, in areas that are relatively free of rabies, distemper should be considered.

This and the three previous reports[4,7,8] indicate either that distemper in raccoons and foxes has occurred more frequently than suspected or is becoming more prevalent. Microscopic examination of brain tissues, in addition to the hippocampus, might help to explain the rabies-like signs in these animals.

CONCLUSIONS

1) Twenty-one raccoons and 3 red foxes were collected from areas where suspected rabies occurred. All were found to be nonrabid.

2) Distemper was diagnosed in 14 of the 21 raccoons by demonstrating intracytoplasmic and intranuclear inclusions in the brain and visceral tissues. Two of the 3 foxes were considered to have distemper; the clinical signs were typical and mouse inoculation tests were negative for rabies.

3) Deaths of the other 7 raccoons were attributed to: leishmaniasis 1, gastritis 1, bronchopneumonia 1, parasitism 2, car injury 1; 1 showed no significant lesions. The death of 1 fox was attributed to parasitism.

4) Distemper may be a frequent cause of death in raccoons and foxes, in epizootics which simulate rabies.

References

[1]Cook, E.: Personal communication, June, 1957.
[2]De Monbreum, W. A.: The Histopathology of Natural and Experimental Canine Distemper. Am. J. Path., *13*, (1937): 187-212.
[3]Green, R. G., and Evans, C. A.: A Comparative Study of Distemper Inclusions. Am. J. Hyg., *29*, (1939): 73-87.
[4]Helmboldt, C. F., and Jungherr, E. L.: Distemper Complex in Wild Carnivores Simulating Rabies. Am. J. Vet. Res., *16*, (1955): 463-469.
[5]Herman, Carlton M., Cowan, A. B., and Habermann, Robert T.: The Prevalence of *Eurytrema Procyonis* Denton (Trematode: Dicrocoelidae) in Some Mammals from Maryland. J. Parasitol., *43*, (1957): 113-114.
[6]Kilham, Lawrence, Habermann, Robert T., and Herman, Carlton M.: Jaundice and Bilirubinemia as Manifestation of Canine Distemper in Raccoons and Ferrets. Am. J. Vet. Res., *17*, (1956): 144-148.
[7]Menges, Robert W., Habermann, Robert T., and Stains, Howard J.: A Distemper-like Disease in Raccoons and Isolation of *Histoplasma Capsulatum* and *Haplasporangium Parvum*. Tr. Kansas Acad. Sc., *58*, (1955): 1.
[8]Robinson, V. B., Newberne, J. W., and Brooks, D. M.: Distemper in the American Raccoon (*Procyon Lotor*). J.A.V.M.A., *131*, (Sept., 1957): 276.
[9]Steele, J. H.: Veterinary Public Health. Advances in Veterinary Science. Academic Press, Inc., New York (1953): 328-375.
[10]Twichell, Reed: Personal communication, June, 1957.
[11]Walton, B. C., Bauman, P. M., Diamond, L. S., and Herman, C. M.: Unpublished data, *Trypanosoma Cruzi* in Raccoons.
[12]Witter, J. Franklin: Personal communication.

A Fatal Nematodiasis in the Camel

BENEDICT J. JASKOSKI, Ph.D., and
WEAVER M. WILLIAMSON, D.V.M.

Chicago, Illinois

A male Bactrian camel (*Camelus bactrianus* Linn.), 6 years old, at the Chicago Zoological Park, became emaciated, weak, and developed diarrhea in the spring of 1955. It had been procured from another zoo at the age of 1 year. Analyses of fecal samples showed a heavy infection with strongyles and Trichuris. The stools were mushy or fluid. On April 15, an initial dosage of 30 Gm. of phenothiazine was fed to the camel in a ration additive, followed by a dose of 1 Gm. per day in the ration for the following 30 days. The ration-additive mixture also contained vitamin D_2, salts of manganese, cobalt, potassium, iron, copper, and an inert base.

Sugar flotation analyses of fecal samples during the summer did not reveal any sig-

From the Department of Biological Sciences, Loyola University, Chicago (Jaskoski), and the Animal Hospital, Chicago Zoological Park, Brookfield, Ill. (Williamson).

Fig. 1—Photograph of a cecal cyst in a camel. x 1.2.

balls of fecal matter were observed in the cecum. From 4 to 6 individual trichurids were found in each of the cystlike balls (fig. 1).

Some of the cyst material was preserved in 10 per cent formalin, embedded in paraffin, sectioned at 8 μ, and stained with hematoxylin and eosin. The sectioned material showed typical connective tissue formation of the cyst wall and extensive leukocytic invasion (fig. 2).

The results of a recent survey of fecal samples from over 300 zoo animals revealed nematode infections in more than half the animals observed. The case cited here is one of the extremes in an older animal with multiple infections. Continuous reinfection, loss of host resistance with age,

Fig. 2—Section of cyst wall showing connective tissue and leukocytic invasion. x 66.

nificant decrease in numbers of eggs recovered. On Sept. 27, 1955, treatment was again initiated, using the same additive mixture and dosages. Tuberculin tests were made and fecal smears were examined for Johne's bacillus but both tests were negative.

The camel died Oct. 3, 1955, and kidney and liver damage, parasitism, and terminal pneumonia were found at necropsy. Numbers of *Camelostrongylus mentulatus* and *Trichostrongylus colubriformis* were recovered from the small intestine. The cecum contained large numbers of the whipworm, *Trichuris globulosa*. Peculiar and lack of an effective anthelmintic(s) were likely major factors contributory to death.

Causes of Neoplastic Bovine Leukosis.—Neoplastic leukosis in cattle may remain in a herd for over 20 years. Unrelated animals introduced into the herd developed the disease while closely related animals in other herds remained free of it. It was concluded that this is not an hereditary disease; instead, there seemed to be a causal agent which is stimulated by environmental factors.—*Vet. Bull. (Nov., 1957): Item 3346.*

Effect of Fat and Other Feed Additives on Gain and Hepatic Vitamin Stores in Steers.—When groups of 3 steers, at Washington State College, were fed for 86 days on an adequate basal ration, the average daily gain was 1.35 lb.; when 7 per cent of animal fat was added, the gain was 1.63 lb.; when the feed contained 5 mg. oxytetracycline per pound, the gain was 2.08 lb.; and with 0.5 mg. of stilbestrol per pound of feed, it was 2.05 lb.

In another 78-day experiment, when steers were fed the basal ration, the liver storage of carotene was 2.96 μg. per gram of liver, the vitamin A storage was 3.08 μg. per gram; when the feed contained 7 per cent fat, the carotene storage was 3.51 μg., the vitamin A storage 3.78 μg.; when fed 5 Gm. of oxytetracycline per pound of feed, the carotene storage was 3.23 μg., the vitamin A storage 7.78 μg.; and when fed 0.5 mg. of stilbestrol per pound of feed, the carotene storage was 4.78 μg., and the vitamin A storage 3.20 μg. The rate of gain was increased significantly by the antibiotic and the hormone, or by a combination of the two, but not by the addition of animal fat. The hepatic vitamin A level was significantly higher in steers fed oxytetracycline.—*J. Anim. Sci. (Nov., 1957): 828.*

• • •

In a somewhat similar experiment, at the University of Nevada, the addition of stilbestrol (10 mg. daily) resulted in an average increased gain of 0.15 lb. daily, whereas with the addition of 5 per cent of animal fat, the gain was 0.56 lb., and with 10 per cent fat, it was 0.26 lb. daily. Feeding chlortetracycline resulted in an increased rate of gain in only one of three test periods; however, it resulted in a decrease in the incidence of liver abscesses.—*J. Anim. Sci. (Nov., 1957): 833.*

Calcium-Phosphorus Ratio and Calf Growth.—In a 140-day feeding trial at the University of Nebraska, when beef calves were fed adequate phosphorus (12 Gm. daily), while the calcium was varied from a ratio of 1.3:1.0 up to 13.7:1.0, the rate of gain decreased (1.33 to 1.10 lb. daily) as the ratio of calcium was increased.—*J. Anim. Sci. (Nov., 1957): 811.*

Chewing and Digestion.—To test the effect of mastication, ten persons swallowed various foods, part chewed and part unchewed, in separate compartments of a mesh bag. When recovered after passage, there was a higher residue (*i.e.*, less digestion) of the unchewed portion of some foods, such as roasted and fried meats and several vegetables, but little difference in the residues of chewed or unchewed portions of other foods, such as roast chicken, stewed lamb, hard-boiled eggs, white bread, and cheese. When lean beef, before being fried, was pounded with a spiked hammer then treated with a proteolytic enzyme from papaya juice, the residue was much less than when the meat was not treated or was treated only with dilute acetic acid or with the proteolytic enzyme or was beaten with a rolling pin. These had little effect.—*Nutr. Rev. (Oct., 1957): 292.*

Grass Tetany in Cows.—Studies indicate that grass tetany, especially in the Netherlands, was associated with eating grass rich in potash and phosphate, and poor in magnesium, lime, and sodium. There was a relationship between the fertilizer used, the resulting chemical composition of the grass, and grass tetany. Top dressing the pasture with compounds containing magnesium, instead of pure potash, improved the serum magnesium level of cows and reduced the incidence of tetany.—*Vet. Bull. (Nov., 1957): Item 3367.*

Animal fat prices are so low that 40 per cent more tallow and grease were used in animal feeds in 1957 than last year. The fats were cheaper mainly because soap makers now prefer detergents.—*Wallaces' Farmer (Nov. 16, 1957): 13.*

Candidiasis in a Young Pig.—A pig, taken from its mother when 24 hours old and raised in a cage on a semisynthetic diet, became emaciated, vomited frequently, and had a white membrane on the root of the tongue when 18 days old. When killed, the only gross lesion was the white, glistening, irregular pseudomembrane which extended from the mouth through the esophagus to the cardia, and a marked edema of the colonic mesentery. The content of the stomach and intestine was dark gray and watery. *Candida albicans* was isolated from the colon as well as the esophagus. It was doubted that the antibiotic in the feed should be considered as a factor.—*J. Comp. Path. and Therap. (Oct., 1957): 342.*

Editorial

Federal Meat Inspection and Livestock Health

A recent communication received from Dr. C. H. Pals, associate director, Meat Inspection Division, ARS, points out the important role veterinary meat inspection plays in our daily lives. He states:

Consumer confidence both in this country and abroad is essential to the prosperity of the livestock and meat industries. The American housewife is becoming more discriminating and has clearly shown that she expects to find the mark of inspection as her assurance of wholesomeness and freedom from adulteration.

When covered by export certificates issued by veterinarians in the Department of Agriculture, American meat from the United States is accepted in every country in the world. These products must continue to move freely in the world market if we are to avoid surpluses that will weaken the demand for livestock products.

Our recent experiences with vesicular exanthema clearly illustrate the disruption in marketing that can occur when a livestock disease gains a foothold. Serious interference with free marketing occurred both in this country and abroad when embargoes were placed on pork from affected areas.

Meat inspection, while principally a consumer-protection service, also provides certain safeguards for the livestock industry that fully justifies the close administrative relationship between meat inspection and other U. S. Department of Agriculture programs. Veterinary meat inspection assures us of a constant survey of the health problems of our livestock population. This may extend from the postmortem examination of an individual animal to the collection of statistics on all food-producing animals slaughtered under federal inspection in a given period (104 million in the last fiscal year). This represents 80 per cent of the animals commercially slaughtered in the United States.

An alert veterinary meat inspection service would be one of the first sources of information on the occurrence of an unusual livestock disease. It could also supply information on the incidence and prevalence of diseases regularly encountered in veterinary practice.

Since the primary object of veterinary meat inspection is to determine whether the animal products are suitable for human food, the examinations conducted are somewhat different than those engaged in by pathologists primarily interested in an exact diagnosis, yet the same principles apply. Much information can be gained from meat inspection reports and from statistical comparisons of annual Federal Meat Inspection Reports.

Condemnations

Cattle-carcass condemnations show a 27 per cent decline in five years—from 55 per 10,000 in 1952 to 40 per 10,000 in 1957.

The most common causes for condemnation of cattle carcasses are pleurisy and pneumonia, neoplasms, and pyemic conditions which, together, are responsible for 39 per cent of all condemnations.

Beef-liver condemnations, which have remained practically constant (14.5%) for the past five years, have attracted considerable attention for many years due both to the economic significance of this loss and to the intriguing aspects of the pathological conditions.

Swine carcass condemnations were reduced 18 per cent—from 22 per 10,000 in 1952 to 18 per 10,000 in 1957. This reduction was most apparent in the cases of pneumonia (from 4 to 2.6/10,000), and hog cholera (from 1.1 to 0.34/10,000).

Nearly 3 per cent of all swine slaughtered, both in 1952 and 1957, had cervical abscesses requiring condemnation of the head and jowls.

Intraprofessional Cooperation

Veterinarians engaged in meat inspection have a responsibility both to the consuming public and to the producers of the animals.

Too often the veterinarian encountering a problem in the field overlooks the fact that he has a colleague practicing veterinary medicine of a somewhat different type at the meat-packing plant. Likewise, the veterinarian in meat inspection can render a much better service to both the public and his practitioner colleague by extending his sphere of interest more deeply into livestock husbandry.

The two groups are part of one profession, and all will benefit if the lines of communication between the two are better developed and more constantly used.

ABSTRACTS

Escherichia Infection in Chickens and Turkeys

Following several routes of inoculation, certain strains of *Escherichia coli* produced aerosacculitis, fibrinous pericarditis, perihepatitis, salpingitis, and panophthalmitis in chickens and turkeys. Natural infection was almost always in combination with chronic respiratory disease, which is due to a pleuropneumonia-like organism. The cellular infiltration consisted of heterophilic and mononuclear phagocytes in varying proportions. Hyperemia and edema were prominent, particularly in the earlier stages of infection. Necrotic areas were, at first, lined with mononuclear phagocytes and, later, by giant cells.—[*W. B. Gross: Pathological Changes of an Escherichia Coli Infection in Chickens and Turkeys. Am. J. Vet. Res., 18, (Oct., 1957): 724-730.*]

Cultivation of Newcastle Disease Virus

Two strains of Newcastle disease virus, the highly pathogenic GB and an avirulent tissue culture-attenuated NDV, were propagated in monolayer cultures of Hela and bovine kidney cells. The degrees of cytopathogenicity, as demonstrated macroscopically by the eighteenth serial passage in both tissues, were correlated with their relative virulence for chickens.—[*R. A. Bankowski and J. Hyde: Cultivation and Cytopathogenicity of Newcastle Disease Virus in Hela and Bovine Kidney Cell Culture. Am. J. Vet. Res., 18, (Oct., 1957): 743-746.*]

Flask for Culturing Yolks of Turkey Eggs

A method of modifying a 300-cc. Erlenmeyer flask by placing a rubber stopper (U.S. Rubber 2771) into a hole produced in the side of the flask is described. A turkey egg is placed in alcohol; the large end is burned black with an improved Fisher burner and the shell is cut away until the yolk is exposed. The lip of the modified flask is placed next to the egg yolk and with a 50-cc. syringe and a ¾-inch, 19-gauge hypodermic needle, inserted into the rubber stopper, air is aspirated from the flask, thus drawing the yolk up into the flask. The yolk in the flask is triturated and cultured. Sterile apparatus and technique are used.—[*B. W. Bierer: A Modified Erlenmeyer Flask for Culturing Entire Yolks of Turkey Eggs. Am. J. Vet. Res., 18, (Oct., 1957): 246-247.*]

Sodium Chloride and Hypoderma Larvae

The body wall of first-instar *Hypoderma lineatum* larvae acts as a semipermeable membrane. These larvae are killed *in vitro* by hypotonic and hypertonic sodium chloride solutions. The time required to destroy the larvae varies directly with their size and inversely with the concentration and temperature of the solution. The possibilities for use of maximal dosage of sodium chloride for the systemic destruction of first-instar Hypoderma larvae *in vivo* are suggested.—[*Peter Gailiunas: Effects of Hypotonic and Hypertonic Sodium Chloride Solutions on First-Instar Hypoderma Lineatum Larvae. Am. J. Vet. Res., 18, (Oct., 1957): 238-240.*]

Phenothiazine Urinary Conjugate in Cows

Purified bovine urinary conjugate of phenothiazine was isolated from the urine of lactating dairy cows fed 100 Gm. of phenothiazine, N.F.

The bovine urinary conjugate was identified as the potassium salt of 3-hydroxyphenothiazine etheral sulfate.—[*T. Ellison, A. C. Todd, and J. Harvey, Jr.: Isolation and Identification of the Phenothiazine Urinary Conjugate in Dairy Cows. Am. J. Vet. Res., 18, (Oct., 1957): 956-958.*]

Distemper Virus from a Raccoon

A virus isolated from a wild, sick raccoon was identified as distemper virus. Identification was based on serum neutralization, transmission, the character of disease produced in ferrets and mink, and cross immunity. The strain of virus was adapted to the chorioallantoic membranes of embryonating chicken eggs where it was propagated for over 40 passages. The egg-adapted virus was immunogenic, but avirulent, for both ferrets and mink.—[*Edward Crook and S. H. McNutt: Egg-Adaptation of a Strain of Distemper Virus Isolated from a Raccoon. Am. J. Vet. Res., 19, (Jan., 1958): 223-224.*]

BOOKS AND REPORTS

Comparative Neuropathology of Man and Animals

In man and in animals, there are many neuropathological conditions occurring under similar clinical and pathological changes. This publication has been devoted to the comparative study of both. The introductory part deals with anatomical and physiological principles of the nervous system of man and animals.

A special part of the publication discusses, in a comparative way, some human and animal conditions of hereditary origin, and of metabolic disorders associated with neuropathological manifestations. The signs of the inflammatory changes of the central and peripheral nervous system caused by viruses, bacteria, fungi, protozoa, and metazoa are described with regard to the location of the pathological process.

Final chapters of the publication deal with tumors, traumatic disorders, and various intoxications which produce neuropathological symptoms.

This interesting publication has numerous comparative illustrations. It is an important and needed contribution for the mutual cooperation between human and veterinary medicine.—[*E. Frauchiger and R. Faukhauser: Comparative Neuropathology of Man and Animals. 451 pages. 271 illustrations. Springer, Berlin-Gottingen-Heidelberg, Germany. 1957. Price not given.*]—F. KRAL.

THE NEWS

New Chief of the U.S.A.F. Veterinary Corps

Colonel Robert R. Miller, U.S.A.F., Veterinary Corps, has been appointed assistant for veterinary services, Major Gen. Dan C. Ogle, U.S.A.F. Surgeon General, announced in November. Colonel Miller assumed his position as head of the U.S.A.F. veterinary services on Sept. 3, 1957.

Colonel Miller graduated from Ohio State University, College of Veterinary Medicine, in 1942. He entered on active duty in 1943, and was assigned to the United States Armed Forces, South Atlantic, as theater veterinarian with headquarters at Recife, Brazil. Later, he was attached to the joint United States-Brazilian military commission at Rio de Janeiro.

—Official U.S.A.F. photo.

Col. Robert R. Miller

On his return from Brazil in 1945, Colonel Miller served with the military district of Washington and, in 1946, was assigned as north sector veterinarian for Oahu, Hawaii. In 1949, he became deputy chief of the veterinary service in the office of the surgeon general and two years later was appointed to the Armed Forces Medical Policy Council in the office of the Secretary of Defense.

During 1951-1952, he was veterinary staff officer with the headquarters U.S.A.F. inspector general's office with a field office at Kelly Air Force Base, Texas.

After graduating from Air War College in 1953, he became the command veterinarian for the Air Defense Command, Colorado Springs.

Colonel Miller has been awarded the commendation medal with oak leaf cluster, the soldier's medal, the diploma and medal pertaining to the Primerira Jornado de Service de Saude de Aeronautica of Brazil, and the honorary Brazilian air force flight surgeon's wings and diploma.

Ralston Purina Fellowship Awards Program for 1958-1959

The Ralston Purina Company has announced that ten research fellowships will be granted for graduate study in the school year, July 1, 1958, to June 30, 1959. The awards will be made in the fields of nutrition and physiology research as applied to dairy, poultry, animal husbandry, and research in transmissible diseases of livestock and poultry.

Any individual qualified for graduate study in a land-grant agricultural college or approved veterinary college (including Canadian colleges), and who possesses other desired qualifications, may be eligible. The application and other requested information must be in the hands of the Awards Committee by March 1, 1958.

Not more than three fellowships will be granted in dairy husbandry, animal husbandry, and poultry husbandry, and not more than one in the field of veterinary science.

Selection of recipients will be made by a committee comprising representatives appointed from the Poultry Science Association, American Veterinary Medical Association, American Dairy Science Association, American Society of Animal Production, Association of Land-Grant Colleges, and the Ralston Purina Company.

The fellowship stipend has been increased this year to $1,800. Application blanks for the awards may be obtained by writing to the Ralston Purina Research Awards Committee, c/o Mr. J. D. Sykes, Ralston Purina Company, St. Louis 2, Mo.

Special Course in Veterinary Radiological Health

The Oak Ridge Institute of Nuclear Studies has announced that a special two-week course in veterinary radiological health will be held in Oak Ridge, Tenn., on March 10-21, 1958.

The course, conducted for the U.S. Atomic Energy Commission by the special training division of the Institute, will be presented in cooperation with the University of Tennessee-AEC Agricultural Research Program and the Veterinary Corps. It will provide indoctrination in radiological health and evaluation of radiation phenomena, particularly in relation to their biological effects and contamination of food-

producing animals or animal food products, and in other areas such as autoradiography, radiation syndrome in domestic animals, and internal irradiation effects.

A token registration fee of $25 will be charged each participant, except employees of the U.S. government, members of the Armed Forces, employees of contractors of the AEC, or those who are sponsored by a government agency.

Detailed information and application blanks may be obtained from Major Max Nold, U.S. Air Force Veterinary Corps, Oak Ridge I.N.S. Special Training Division, P. O. Box 117, Oak Ridge, Tenn.

Dr. Mattison Appointed A.P.H.A. Secretary

Berwyn F. Mattison, M.D., M.P.H., former secretary of health of Pennsylvania, has been appointed executive secretary of the American Public Health Association, succeeding the late Dr. Reginald M. Atwater whose death was noted in a recent issue of the JOURNAL.

Dr. Mattison received his medical training at McGill University, his M.P.H. at Johns Hopkins, and then served with the New York State, Yonkers, and Erie County (N.Y.) health departments before going to Pennsylvania in 1955.

Avian PPLO Diagnostic Antigen Available

Production of Avian PPLO Diagnostic Antigen for poultry disease research and diagnosis was begun recently at the Storrs Argicultural Experiment Station at the University of Connecticut.

A United States veterinary license issued to the Department of Animal Diseases in January, 1957, authorized the department to bottle the antigen for sale, according to Dr. Erwin L. Jungherr, head of the department.

Techniques for the production of the antigen and for the agglutination tests were developed at the Storrs station. Two years of experimental work now makes possible practical application of large scale serological testing. Results of this research were reported at the pullorum conference in 1954.

The antigen can be used for the serum plate, whole blood, and tube agglutination tests, according to Dr. Jungherr. It is available to official

Summary of Veterinarians Awarded Public Health Degrees During the 1956-1957 Academic Year

Name of student	School ††	Degree	Date Granted
Philip Hotchkiss, D.V.M.	University of California, School of Public Health	*M.P.H.	June, 1957
Warren G. Hoag, D.V.M.	Harvard University, School of Public Health	M.P.H.	June 13, 1957
Erik Holager, D.V.M.	Harvard University, School of Public Health	M.P.H.	June 13, 1957
Douglas F. Moe, D.V.M.	Johns Hopkins University, School of Hygiene and Public Health	M.P.H.	June 11, 1957
J. Douglas McCluskie, D.V.M.	University of Michigan, School of Public Health	M.P.H.	June 15, 1957
Lyle Moffit, D.V.M.	University of Michigan, School of Public Health	M.P.H.	June 15, 1957
Everett D. Besch, D.V.M.	University of Minnesota, School of Public Health	M.P.H.	Aug. 16, 1957
Arthur L. Lewis, D.V.M.	University of Minnesota, School of Public Health	M.P.H.	June 15, 1957
Elwood E. Wedman, D.V.M.	University of Minnesota, School of Public Health	M.P.H.	June 15, 1957
Enrique Mora-Campos, D.V.M.	University of Montreal, School of Hygiene	†D.V.P.H.	July 18, 1957
Duane F. Brobst, A.B., D.V.M.	University of Pittsburgh, Graduate School of Public Health	M.P.H.	June 12, 1957
Victor M. Denis, D.V.M.	University of Toronto, School of Hygiene	D.V.P.H.	May, 1957
James R. S. Saunders, D.V.M.	University of Toronto, School of Hygiene	D.V.P.H.	May, 1957
John E. Sterns, D.V.M.	University of Toronto, School of Hygiene	D.V.P.H.	May, 1957
Clifford D. Beyler, D.V.M.	Tulane University, Department of Tropical Medicine and Public Health	M.P.H.	June 3, 1957
Absalom B. Rich, D.V.M.	Tulane University, Department of Tropical Medicine and Public Health	M.P.H.	June 3, 1957
John B. Vaughn, Jr., D.V.M.	Tulane University, Department of Tropical Medicine and Public Health	M.P.H.	June 3, 1957

*M.P.H.=Master of Public Health; †D.V.P.H.=Diploma in Veterinary Public Health.

††The schools or departments of public health in Columbia University, Yale University, and the Universities of North Carolina, and of Puerto Rico did not award degrees to veterinarians in the 1956-1957 academic year.

state diagnostic laboratories, other reputable institutions and laboratories, and persons concerned with the research and diagnosis of poultry diseases. These persons must be qualified to interpret and evaluate the results obtained from the antigen.

The antigen, with instructions for use, is bottled in 100-ml. amounts.

Area Poultry Inspection Offices Open at Atlanta and Dallas

Two new area poultry inspection offices opened in full operation Jan. 1, 1958, to aid in the supervising of the Agricultural Marketing Service's poultry inspection program, the U.S.D.A. has announced. This brings the number of area offices to six, including San Francisco, Chicago, Des Moines, and Philadelphia.

Dr. Kenneth M. McEnroe is area supervisor in Dallas and Dr. Jonathan K. Keim is in charge of the Atlanta office.

AMONG THE STATES AND PROVINCES

Arizona

Dr. Wilkins Joins Federal Disease Control Service.—Dr. H. F. Wilkins, former state veterinarian of Montana, who retired on Aug. 1, 1957, after 41 years of state service in Montana, is now living in Phoenix, Ariz., where he has joined the staff of the Animal Disease Eradication Branch, Agricultural Research Service, U.S.D.A., which is headed by Dr. Donald Miller.

California

California Association.—The Midwinter Conference of the California V. M. A. will be held at the School of Veterinary Medicine, University of California, Davis, Jan. 27-29, 1958.

Among the speakers on the three-day program are Dr. Heinz Fraenkel-Conrat, virus laboratory, University of California, Berkeley; Dr. Jean Holzworth, Angell Memorial Animal Hospital, Boston; and Dr. A. G. Boyd, assistant director, Agriculture Department, Sacramento.

There will also be closed circuit TV programs sponsored by the Pitman-Moore Company. Approximately 400 veterinarians are expected to attend the meeting. Drs. Charles H. Ozanian, Bellflower, and Peter C. Kennedy, Davis, are co-chairmen of the program.

s/CHARLES S. TRAVERS, *Executive Secretary.*

• • •

Association Has Changed Its Name.—The California State Veterinary Medical Association has eliminated the "State" from its name. The new name is The California Veterinary Medical Association.

District of Columbia

Pilot feeding at extreme altitudes is discussed by Lt. Colonel W. D. Nettles, V.C., U.S.A.F. (right), of the Quartermaster Food and Container Institute for the Armed Forces in Chicago, with (left to right) two foreign delegates and Dr. Joseph R. McMahon, civilian employee health service, Washington, D. C. Colonel Nettles spoke at the association meeting of military surgeons, Oct. 28-30, 1957, in Washington, D. C., on the feeding of pilots in flight with canned liquids and concentrated foods in lipstick-type dispensers.

Illinois

Mississippi Valley Women's Auxiliary.—The twentieth annual meeting of the Women's Auxiliary to the Mississippi Valley V.M.A. was held at the Hotel Pere Marquette, Peoria, on Oct. 23-24, 1957. Fifty-eight members and guests were present.

A luncheon was held in the La Salle Room of the Pere Marquette Hotel on October 23, and on October 24, a brunch and the annual business meeting were held in the American Room, with Mrs. R. W. Kennedy, Colfax, presiding.

The auxiliary's officers for 1958 are: Mrs. Paul A. Ling, Lexington, president; Mrs. Paul W. Hendren, Carthage, president-elect; and Mrs. Homer R. Teegarden, Eureka, secretary-treasurer.

• • •

Southern Illinois Women's Auxiliary.—The semiannual meeting of the Women's Auxiliary to the Southern Illinois V.M.A. met in Effingham on Nov. 19, 1957.

Mrs. Al Daughty presided over the business meeting. The auxiliary voted to send $15 to the AVMA Research Fund and $10 to the Auxiliary Memorial Fund.

The following officers were elected for the coming year: Mrs. C. H. Rodgers, Highland, president; Mrs. R. D. Shilliday, Waterloo, vice-president; and Mrs. R. J. Wells, Benton, secretary-treasurer.

Mrs. C. H. Horstman, Collinsville, was appointed delegate and Mrs. T. M. Wise, Effingham, alternate, to the AVMA Auxiliary convention in Philadelphia next year.

s/MRS. R. J. WELLS, *Secretary.*

Indiana

Joint Meeting of Physicians and Veterinarians.—The first joint dinner meeting of the Michiana Veterinary Medical Association and the St. Joseph County Medical Society, was held Nov. 26, 1957, in the Bronzewood Room of the Hotel LaSalle, South Bend, Ind. The Michiana V.M.A. was the host.

Dr. Frank Kral, of the School of Veterinary Medicine, University of Pennsylvania, was the speaker of the evening. His subject was "Skin Diseases Transmissible from Animals to Man." Dr. Kral, formerly dean of the School of Veterinary Medicine in Brne, Czechoslavakia, is one of the outstanding authorities in veterinary dermatology. He has been a member of the faculty of the University of Pennsylvania since 1949.

s/STANTON WILLIAMSON, *Secretary.*

Iowa

Midwest Small Animal Association.—The Midwest Small Animal Association met in Burlington, Iowa, Nov. 13-14, 1957, at the Hotel Burlington. Over 150 registered for the meeting. This association, whose aim is to improve medical and hospital care of pet animals, especially in rural and suburban areas, has attracted veterinarians from over half the states in the union for over 20 years to its surgical clinics and technical programs.

The new officers elected are: Drs. Jack Dinsmore, Glenview, Ill., president; R. H. Gump, Wichita, Kan., vice-president; J. Porter Coble, Springfield, Ill., secretary-treasurer. Dr. D. S. Steele, Minneapolis, retiring president, became a trustee and the "holdover" trustee is Dr. R. B. Koger, of Joplin, Mo.

s/GRANT B. MUNGER.

• • •

Eastern Iowa Women's Auxiliary.—The Eastern Iowa V.M.A. held its forty-fourth annual meeting, Oct. 17-18, 1957, in Cedar Rapids, at the Sheraton-Montrose Hotel.

Left to right—Mrs. Edwin Osen, Anita, Iowa, president, Iowa Auxiliary; Mrs. Lewis H. Moe, president, AVMA Auxiliary; Mrs. F. E. Brutsman, Traer; and Mrs. James Barclay.

Dr. Ian Smith, M.D., Department of Internal Medicine, State University of Iowa, spoke on the "Interaction of Human and Veterinary Medicine." The business meeting was held following a luncheon at the Sheraton-Montrose Hotel, October 17.

First row—Mrs. A. J. McIntosh, La Porte City, president-elect; Mrs. James Barclay, Brooklyn, president, Eastern Iowa Auxiliary; Mrs. F. E. Brutsman, past-president; and Mrs. Floyd Beaver, Grinnell, treasurer. Second row—Mrs. Leroy Bell, Davenport, vice-president; Mrs. K. H. Randolph, Lost Nation, secretary.

Mrs. F. E. Brutsman, Traer, retiring president, welcomed two distinguished guests: Mrs. L. H. Moe, Stillwater, Okla., president of the Women's Auxiliary to the AVMA, and Mrs. E. J. Osen, Anita, Iowa, president of the Women's Auxiliary to the Iowa State V. M. A. Mrs. Moe and Mrs. Osen outlined their respective projects and activities for the coming year.

In the evening, the annual banquet and ball were held in the crystal ballroom of the hotel. Dr. Edwin E. Ballantyne, Edmonton, Alta., who had addressed the veterinarians earlier in the day on "Rabies Control in Alberta Wildlife," was the guest speaker. Dr. Ballantyne is director of the Veterinary Services Branch, Department of Agriculture, in Alberta Province.

The following officers were elected for the new year: Mrs. J. E. Barclay, Brooklyn, president; Mrs. A. J. McIntosh, La Porte City, president-elect; Mrs. LeRoy Bell, Davenport, vice-president; Mrs. K. H. Randolph, Lost Nation, secretary; and Mrs. Floyd Beaver, Grinnell, treasurer.

s/MRS. C. K. PFAFF, *Publicity Chairman.*

Maine

State Association.—The fall meeting of the Maine V.M.A. was held at the Lancy House, Pittsfield, on Nov. 6, 1957.

Two veterinarians reported on the New England Association meeting, held October 6-9: Dr. Ray Newman, Island Falls—large animals; and Dr. Sidney Stiles, Portland—small animals.

At the business meeting, reports were presented by Drs. A. E. Coombs, Skowhegan, AVMA House representative; G. W. Breed, Augusta, federal veterinarian; and R. E. Libby, Richmond, state veterinarian.

s/J. F. WITTER.

Missouri

Senior Students Rotated Through University of Missouri's School of Medicine.—Senior students in the School of Veterinary Medicine, University of Missouri, are being permitted to spend time in the animal quarters of the School of Medicine.

This arrangement, on an experimental basis at the present time, is considered essential due to the increasing inquiries from schools of medicine and human hospitals for veterinarians who have had experience in this area of veterinary medicine.

• • •

Myra Lockhart Receives Humane Act Award—The AVMA Humane Act Award for 1957 was presented to Myra Allena Lockhart, Mountain Grove, Mo., by Dr. R. D. Campbell, president, Missouri V.M.A., at the banquet held in conjunction with the thirty-third annual short course for veterinarians at the University of Missouri, October, 1957.

Miss Lockhart was unable to be present in Cleveland to receive the award at the AVMA's Ninety-Fourth Annual Convention in August.

• • •

Missouri Women's Auxiliary.—The Women's Auxiliary to the Missouri V.M.A. met Oct. 14, 1957, in the Student Union Building at the University of Missouri, Columbia.

The luncheon and business meeting was attended by 120 members and guests. Mrs. E. E. Leasure, wife of the dean of the School of Veterinary Medicine at Kansas State College, was the auxiliary's special guest of honor.

Mrs. J. A. McKitterick, president, conducted the business meeting. The auxiliary voted to raise the dues of the members in order to increase its contributions to the loan fund, and to send two delegates to the national convention in Philadelphia, in 1958.

The next meeting of the auxiliary will be held in Kansas City, Mo., in February.

s/MRS. E. F. DAMER, *Secretary.*

New Hampshire

New Hampshire Association.—The New Hampshire V.M.A. held its fall meeting at the Hotel Carpenter in Manchester, N. H., Nov. 6, 1957. The program was arranged by Dr. Lionel Trudel, Portsmouth.

Dr. Francis M. Austin, Belchertown, Mass., presented and narrated two films on large and small animal surgery and the breaking and training of light horses.

Dr. George C. Cilley, Jr., president, announced that the annual business meeting would be held at the Highway Hotel in Concord on Jan. 22, 1958, at 2:00 p.m.

s/FRED E. ALLEN, *Secretary.*

New Jersey

Metropolitan New Jersey Association.—The Metropolitan New Jersey V.M.A. will meet at the Academy of Medicine Building, South Newark, Jan. 15, 1958, at 8:30 p.m.

Dr. Robert S. Brodey, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, will discuss "Surgical Cases of the Canine Abdomen."

A film entitled, "Local Anesthesia in the Canine," will also be included on the program.

South Carolina

Dr. John Brown, Former Private, Commissioned.—Dr. John Francis Brown, a private, who has been on active duty as an enlisted man since July, 1956, took the oath of an officer in the U. S. Army Veterinary Corps in commissioning ceremonies at Walter Reed Army Medical Center, Washington, D. C., Nov. 5, 1957.

The silver bars of Lieutenant Brown's new commission are being pinned to his uniform by Brig. Gen. Elmer W. Young (left), chief of the Veterinary Corps, and by his mother, Mrs. J. Dexter Brown.

The oath was administered by Brig. Gen. Elmer W. Young, chief, V.C., U.S. Army.

Since his arrival at Walter Reed Army Medical Center in October, Lieutenant Brown has been stationed with the center's medical unit at Fort Detrick, Md.

Texas

Texas Women's Auxiliary.—The Women's Auxiliary to the Texas Veterinary Medical Association met in conjunction with the Texas

V.M.A. at the Baker Hotel in Dallas, Oct. 16-18, 1957.

The auxiliary voted to contribute to the AVMA Research Fund and the AVMA Auxiliary Award Fund.

The following officers were elected for the ensuing year: Mrs. H. E. Jameson, Galveston, president; Mrs. J. E. Habluetzel, Corpus Christi, president-elect; Mrs. W. F. Juliff, San Angelo, vice-president; Mrs. J. W. Gupton, Richmond, secretary-treasurer; and Mrs. E. A. Henderson, Galveston, corresponding secretary.

s/MRS. W. F. JULIFF, *Vice-President.*

Virginia

Women's Auxiliary to the Southern V.M.A.—The Women's Auxiliary to the Southern V.M.A. held its annual meeting in the Hotel Roanoke, Roanoke, Va., on Oct. 29, 1957, with Mrs. James E. Scatterday of Jacksonville, Fla., presiding. The roll call of states showed 74 women in attendance, four of whom were presidents of their state auxiliaries.

During the business meeting, the revised constitution and bylaws were accepted.

Interesting reports were given by delegates to the AVMA Auxiliary house of representatives for the past two years: for 1956, Mrs. M. R. Blackstock, South Carolina, and 1957, Mrs. Hugh Lamb of Tennessee.

The following recommendations from the executive board were accepted: We will not participate in the radio and TV series, as this overlaps with the state auxiliaries. We will participate in the newsclipping service as an aid to the public relations department of the AVMA. We will make the following donations: AVMA Research Fund, $15; Library Fund at Auburn, $15; Memorial Fund, $15. This latter donation will be given in honor of Mrs. John D. Gadd of Maryland, a charter member of the Southern Auxiliary.

Officers elected for the year are: Mrs. Joe Sledge, Alabama, president; Mrs. C. W. Young, Mocksville, N. Car., president-elect; Mrs. A. W. Rice, Roanoke, Va., first vice-president; Mrs. E. E. Chambers, Rossville, Ga., second vice-president; Mrs. M. K. Heath, Auburn, Ala., secretary; Mrs. O. M. Strook, Charleston, S. Car., treasurer.

s/MRS. HUGH LAMB, *Acting Secretary.*

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. are reported as of Oct. 7, 17, 28, and Nov. 5, 1957.

TRANSFERS

Wiley W. Bird, from Chicago, Ill., to Indianapolis, Ind.
James E. Boyd, from National Stockyards, to Kansas City, Kan.
James M. Brink, from Cincinnati, Ohio, to Lexington, Ky.
LeRoy V. Carlyle, from St. Paul, Minn., to Springfield, Ill.
Paul D. DeLay, from Amsterdam, Holland, to Greenport, L.I., N.Y.
William N. Dudley, from Pierre, S. Dak., to St. Paul, Minn.
William W. Green, from Olympia, Wash., to Reno, Nev.
Willis H. Irvin, from Chicago, Ill., to Indianapolis, Ind.
Robert E. Kind, from Jefferson City, Mo., to Kansas City, Kan.
William P. Meleney, from Oklahoma City, Okla., to Albuquerque, N.M.
Edwin D. Peck, from Olympia, Wash., to Salt Lake City, Utah.
Paul K. L. Schmidt, from National Stockyards, to St. Louis, Mo.
Louis M. Singleton, from Bismarck, N. Dak., to Los Angeles, Calif.
Donnis E. Sweeney, from White Hall, Ill., to Madison, Wis.
Thomas W. Tamoglia, from Madison, Wis., to Kansas City, Kan.
Paul O. Thomas, from Springfield, Ill., to Kansas City, Kan.

RETIREMENTS

George Caneal, Riverside, Calif.
John A. Patton, Milwaukee, Wis.
Charles Webster, Topeka, Kan.
Joseph E. Zeltzer, Detroit, Mich.

DEATHS

Eugene P. Kormendy, Frankfort, Ky.

STATE BOARD EXAMINATIONS

CALIFORNIA—January 30-31 and Feb. 1, 1958. Davis. William E. Barbeau, executive secretary, 1020 N. St., Sacramento 14, Calif.

COLORADO—Jan. 15-16, 1958, Arvada; and first week in June, depending on graduation date, Fort Collins. W. D. Stauffer, secretary, 5500 Wadsworth Blvd., Arvada, Colo.

MINNESOTA—Jan. 6-7, 1958, St. Paul. A. C. Spannaus, secretary, Route 1, Waconia, Minn.

NEW MEXICO—Jan. 13, 1958. Santa Fe. Edwin J. Smith, secretary, P.O. Box 4385, Santa Fe, N.M.

NORTH DAKOTA—April 9-10, 1958, Fargo. M. C. Hawn, secretary-treasurer, 1407 13 St. N., Fargo, N. Dak.

PUERTO RICO—Jan. 7, 1958. San Juan. Joaquin Mercado Cruz, secretary, Box 3271, San Juan, P. R.

TEXAS—Jan. 15-17, 1958, Austin. T. D. Weaver, executive secretary, 207 Capital National Bank Building, Austin 16, Texas.

DEATHS

Star indicates member of AVMA

Arthur W. Ewing (KCV '12), 75, Morrisville, Mo., died Sept. 13, 1957, after a lingering illness. He was a practicing veterinarian for 45 years.

He is survived by his wife, Emma May, two sons, two brothers, and a sister.

★**Walter L. Fehrenbacher** (ILL '54), 28, Williamsfield, Ill., died Oct. 3, 1957, in an auto accident.

Dr. Fehrenbacher was killed instantly when his station wagon collided with an automobile four miles north of Brimfield, Ill., as the veterinarian was making his midmorning calls.

Surviving are his wife, Mary Lou Lynn Fehrenbacher, and four children.

★**Joab P. Foster** (ONT '00, MCK '08), 66, Minneapolis, Minn., died on Oct. 25, 1957.

Born at Bangor, Maine, in 1871, Dr. Foster received his V.S. degree in 1900 from Ontario Veterinary College, and being an insatiable student, went on to earn five additional degrees: B.S. from Huron College, South Dakota, in 1907; M.D.V. from McKillip Veterinary College, Chicago, in 1908; M.S. from Coe College, Iowa, in 1914; B.V.Sc. from the University of Toronto, in 1914; and an M.S. from the University of Minnesota, in 1920 (the latter following work done as a fellow in experimental surgery at the Mayo Foundation in 1918-1919).

Among his other professional activities were six years as state veterinarian of South Dakota, from 1901 to 1907; inspector with the Bureau of Animal Industry, U.S.D.A., from 1908 to 1916; with the Minneapolis division of public health, from 1919 to 1921; and as a public health inspector with the State of Minnesota for many years.

Dr. Foster joined the AVMA in 1909, and was chairman of its committee on history for several years. He was also a member of the Minnesota State V.M.A., the American Public Health Association, and the American Association for the Advancement of Science.

He was the author of some 30 papers on a wide variety of subjects in the field of veterinary medicine.

★**E. T. Hallman** (API'10), 73, East Lansing, Mich., for 34 years head of the department of animal pathology at the College of Veterinary Medicine, Michigan State University, until his retirement in 1949, died on Nov. 18, 1957, from a heart ailment.

Born at Oxford, Ala., in 1884, Dr. Hallman joined the faculty at East Lansing two years after receiving his degree at Alabama Polytechnic Institute and became head of the animal pathology department in 1915. He was a leader in community affairs and professional circles for many years.

Coming to East Lansing a few years after its incorporation, he helped direct its development, served on the city council for ten years, was a trustee of his church for 23 years, and a director of one of its banks.

Dr. Hallman's abilities and sound judgment gained wide recognition in professional circles and he was called upon to serve in various capacities, including membership on the AVMA Committee on Education from 1936 to 1944 (chairman, 1943-44); and member and chairman of the Research Council from 1944-1947. He was a past-president of the Michigan State V.M.A., a member of Phi Kappa Phi, Sigma Xi, and Alpha Psi honor societies, and of the Rotary Club.

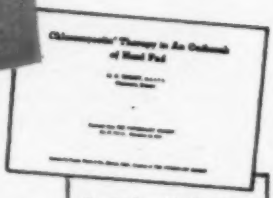
Surviving are his widow, Mrs. Alma Cook Hallman, whom he married in 1912, two daughters, and seven grandchildren.

AVAILABLE* REPRINTS OF REPORTS OF EXPERIENCE WITH CHLOROMYCETIN®

CHLOROMYCETIN PALMITATE IN THE TREATMENT OF KENNEL COUGH

by James E. Cook, D.V.M.

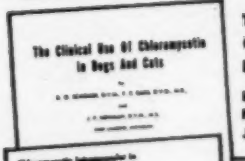
Reprint, *The North American Veterinarian*



CHLOROMYCETIN THERAPY IN AN OUTBREAK OF HARD PAD

by M. B. Toosey, M.R.C.V.S.

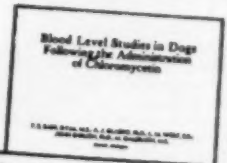
Reprint from *The Veterinary Record*

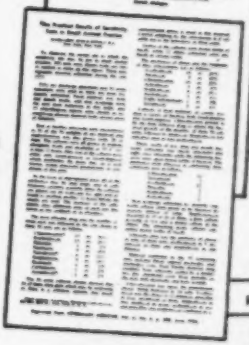


THE CLINICAL USE OF CHLOROMYCETIN IN DOGS AND CATS

by R. G. Schirmer, D.V.M., F. E. Eads, D.V.M., M.S., and J. P. Newman, D.V.M., M.S.

Reprint from *Veterinary Medicine*





BLOOD LEVEL STUDIES IN DOGS FOLLOWING THE ADMINISTRATION OF CHLOROMYCETIN

by F. E. Eads, D.V.M., M.S.; A. J. Glazko, Ph.D.; L. M. Wolf, B.S.; John Ehrlich, Ph.D.; M. Galbraith, M.S.

Reprint from the *American Journal of Veterinary Research*

CHLOROMYCETIN INTRAMUSCULAR IN SHIPPING FEVER IN CALVES

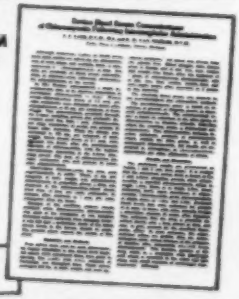
by R. W. Barnes, D.V.M.

Reprint, *The North American Veterinarian*

THE PRACTICAL RESULTS OF SENSITIVITY TESTS IN SMALL ANIMAL PRACTICE

by Margaret Schlichting, B.A.

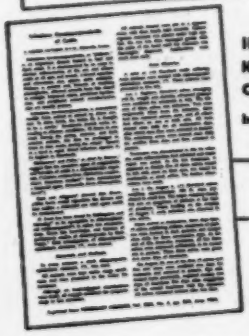
Reprint from *Veterinary Medicine*



BOVINE BLOOD SERUM CONCENTRATIONS OF CHLOROMYCETIN FOLLOWING INTRAMUSCULAR ADMINISTRATION

by F. E. Eads, D.V.M., M.S. and K. D. Van Nocker, D.V.M.

Reprint from *The California Veterinarian*



INFECTIOUS KERATOCONJUNCTIVITIS OF CATTLE

by S. Lester Jackson, D.V.M.

Reprint from *Veterinary Medicine*

***THESE AND OTHER PUBLICATIONS ON CHLOROMYCETIN AVAILABLE ON REQUEST**

VETERINARY DEPARTMENT

PARKE, DAVIS & COMPANY

Detroit 32, Michigan • Toronto 14, Ontario

STUDENT CHAPTER ACTIVITIES

Missouri Student Chapter.—The Missouri Student chapter of the AVMA held its annual smoker in the Memorial Student Union, Sept. 30, 1957.

Dean A. H. Groth introduced the incoming freshman class. The guest speaker was Emil Kuhn who spoke on his recent trip to the national AVMA convention in Cleveland.

s/GLENN E. GARWOOD, *Secretary.*

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (e) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with paragraph (c) Section 2, Article X, of the Administrative Bylaws.

ACH, WOLFGANG M.
408 High St., P. O. Box 102, Irvington, Ky.
D.V.M., Bavarian Ludwig Maximilian University, 1953.

CLAY, HUBERT L.
P. O. Box 34, Shepherdsville, Ky.
D.V.M., Tuskegee Institute, 1956.

MILIN, GABRIEL
P.O. Box 1508, Melfort, Sask.
D.V.M., Vienna Veterinary College, 1933.

THAL, ARLENE
Rt. 4, Box 21 A, Holly Springs, Miss.
D.V.M., Alabama Polytechnic Institute, 1949.

Applicants—Not Members of Constituent Associations

In accordance with paragraph (e) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

RYAN, ROBERT P.
3018 Oakland Blvd., N.W., Roanoke, Va.
D.V.M., State College of Washington, 1945.

Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative Bylaws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Second Listing

ANDERSON, BURLEIGH P., V.M.D., 301 So. Union Ave., Havre De Grace, Md.

CROASMUN, WILLIAM A., V.M.D., R.D. 3, Titusville, Pa.

DUDLEY, WILLIAM N., D.V.M., 962 Canal Ave., St. Paul, Minn.

SACK, WOLFGANG, D.V.M., 6448 N. Clark St., Chicago, Ill.

to calm the hard-to-handle dog

SERPASIL®

". . . indicated in controlling abnormal emotional responses in dogs where they create a problem for the veterinarian and the owner."[1]

Serpasil improves the value of highly nervous dogs as companions[1] **– The drug reduces frequency of barking, pacing, drooling induced by stressful conditions such as transportation, visitors to the home and holiday tensions and noises.**

Serpasil aids veterinarians in the management of hard-to-handle dogs[1] **– Given 2 to 3 days beforehand, Serpasil calms nervous, vicious animals prior to examination, grooming, surgery and bandaging and . . . Serpasil tranquilizes excitable dogs being maintained in boarding kennels and hospitals.[2]**

Usual dosage: **Daily dose range of 0.01 to 0.02 mg./kg. of body weight (0.2 mg. daily for a 20-lb. dog). Initially this should be divided into a morning and evening dose. Once the desired effect is achieved, single daily doses will usually suffice to maintain animals. Doses as low as half of a 0.1-mg. tablet are sufficient in toy breeds.**

Supplied: **Tablets, 0.1 mg. (white) and 0.25 mg. (white, scored); bottles of 100, 500 and 1000.**

CIBA
SUMMIT, N. J.

1. Karmin, L. R.: N. Am. Veterinarian *36*:846 (Oct.) 1955. 2. Earl, A. E.: J. Am. Veterinary Med. Assoc. *129*:227 (Sept. 1) 1956.

COMING MEETINGS

Pennsylvania, University of. Fifty-eighth annual conference of veterinarians. Jan. 7-8, 1958, School of Veterinary Medicine, University of Pennsylvania, Philadelphia. Dr. James Mark, chairman.

Cornell University. Annual conference for veterinarians. New York State Veterinary College, Ithaca, Jan. 8-10, 1958. W. A. Hagan, dean.

Ohio State Veterinary Medical Association. Seventy-fourth annual meeting. Netherland Hilton Hotel, Cincinnati, Jan. 8-10, 1958. Harry C. Sharp, executive secretary.

Oklahoma Veterinary Medical Association. Annual meeting. Hotel Lawtonian, Lawton, Jan. 9-10, 1958. Mrs. Larma Bennett, 2805 S. W. 51 St., Oklahoma City, executive secretary.

Kansas Veterinary Medical Association. Annual convention. Hotel Broadview, Wichita, Jan. 12-14, 1958. K. Maynard Curts, 5236 Delmar Ave., Kansas City 3, Kan., secretary.

Tennessee Veterinary Medical Association. Annual meeting. Hotel Andrew Jackson, Nashville, Jan. 12-14, 1958. H. W. Hayes, 5009 Clinton Pike, Nashville, secretary-treasurer.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Des Moines, Jan. 14-16, 1958. F. B. Young, Waukee, Iowa, secretary.

American Board of Veterinary Toxicologists. Winter meeting. Salt Lake City, Utah, Jan. 15, 1958. William F. Harris, 1102 East Main St., Puyallup, Wash., secretary.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin, Indianapolis, Ind., Jan. 15-17, 1958. L. M. Borst, 3315 Shelby, Indianapolis, secretary.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Jan. 16-18, 1958. R. A. Bagley, 4600 Creek View Dr., Murray, Utah, secretary.

South Carolina Association of Veterinarians. Winter meeting. Hotel Columbia, Columbia, S. C., Jan. 18, 1958. Worth Lanier, secretary-treasurer.

Minnesota Veterinary Medical Association. Annual meeting. St. Paul Hotel, St. Paul, Jan. 20-22, 1958. B. S. Pomeroy, School of Veterinary Medicine, University of Minnesota, St. Paul 1, Minn., secretary.

Michigan State University. Thirty-fifth annual postgraduate conference for veterinarians, Jan. 22-23, 1958. College of Veterinary Medicine, Michigan State University, East Lansing. W. W. Armistead, dean.

California Veterinary Medical Association. Midwinter conference. School of Veterinary Medicine, University of California, Davis, Jan. 27-29, 1958. C. S. Travers, 3004 16th St., San Francisco, executive secretary.

Louisiana State University. Annual veterinary conference. Louisiana State University, Baton Rouge, Jan. 28-29, 1958. W. T. Oglesby, Baton Rouge 3, La., head.

North Carolina State College. Conference for veterinarians. North Carolina State College, Raleigh, Jan. 28-31, 1958. C. D. Grinnells, chairman.

Maryland State Veterinary Medical Association. Annual Winter meeting. Emerson Hotel, Baltimore, Md., Jan. 30-31, 1958. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore 14, Md., secretary-treasurer.

Oregon Veterinary Medical Association. Winter meeting. Portland, Jan. 31-Feb. 1, 1958. Edward L. Holden, P. O. Box 445, Oswego, secretary.

Missouri Veterinary Medical Association. Hotel Continental, Kansas City, Mo., Feb. 9-10, 1958. W. L. Schondelmeyer, 116 E. Maple, Independence, Mo., chairman.

Wisconsin Veterinary Medical Association. Forty-second annual meeting. Hotel Pfister, Milwaukee, Wis., Feb.

58-1

10-12, 1958. Burr A. Beach, Veterinary Science Bldg., University of Wisconsin, Madison 6, Wis., secretary.

New Jersey Veterinary Medical Association. Seventy-fourth annual meeting. Hotel Berkeley-Carteret Hotel, Asbury Park, N. J., Feb. 12-13, 1958. John R. McCoy, Rutgers University, New Brunswick, N. J., secretary.

Region Four American Animal Hospital Association. Winter meeting. Veterinary Clinic, Fort Collins, Colo., Feb. 16, 1958. D. T. Albrecht, secretary.

Colorado State University. Nineteenth annual veterinary conference. Glover Veterinary Hospital, College of Veterinary Medicine, Colorado State University, Fort Collins, Colo., Feb. 17-19, 1958, Lloyd C. Moss, head Department of Medicine, Colorado State University, secretary.

Illinois State Veterinary Medical Association. Annual convention. LaSalle Hotel, Chicago, Feb. 17-19, 1958. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., executive-secretary.

Alabama Veterinary Medical Association. Annual meeting. Hotel Stafford, Tuscaloosa, March 16-18, 1958. M. K. Heath, Alabama Polytechnic Institute, Auburn, secretary.

Washington, State College of. Annual Conference of Veterinarians. Pullman, Wash. April 7-9, 1958. W. R. Leader, program chairman.

American Animal Hospital Association. Silver anniversary meeting. Drake Hotel, Chicago, Ill., April 23-26, 1958. Dr. Wayne H. Riser, secretary.

Oklahoma State University. Oklahoma conference for Veterinarians. College of Veterinary Medicine, Oklahoma State University, Stillwater, May 5-6, 1958. Lester Johnson, Department of Veterinary Medicine and Surgery, chairman.

New York State Veterinary Medical Society. Sixty-seventh annual meeting. Concord Hotel, Kiamesha Lake, N. Y., Sept. 10-12, 1958. Joan S. Halst, 803 Varick St., Utica, N. Y., executive secretary.

New England Veterinary Medical Association. Annual meeting. Hotel Wentworth, Portsmouth, N. H., Sept. 21-24, 1958. C. Lawrence Blakely, 100 Longwood Ave., Boston 15, Mass., secretary-treasurer.

Foreign Meetings

Sixth International Congresses on Tropical Medicine and Malaria. Lisbon, Portugal, Sept. 5-13, 1958. Professor Manuel R. Pinto, Institute of Tropical Medicine, Lisbon, secretary-general. (Membership application forms may be obtained by U.S. veterinarians by writing to the AVMA.)

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. B. M. Lauderdale, Montgomery, secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, Decatur, Ala., secretary.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2 Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical

Got your free copy? The Haver-Lockhart Veterinarians' Daily Record Book provides hour-by-hour, day-by-day record of client names, service performed, fees, payments. Also room for monthly cash accounts, record of tax deductible payments, income tax summary, postal information, handy almanac of facts, laboratory and supply record. If you haven't received your copy yet, tell your Haver-Lockhart man, or write us in Kansas City.

Another personal service for you from HAVER-LOCKHART LABORATORIES

58-1

another surgical procedure

well done with the help of short-acting

NEMBUTAL®

(Pentobarbital, Abbott)

provides any desired degree of cerebral depression from mild sedation to deep hypnosis Abbott

Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December at 3004 16th St., San Francisco, Calif. Mr. Herb Warren, executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. A. L. Irwin, 301 Taft Highway, Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month, Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. R. C. Lawson, 40-40 El Camino, Palo Alto, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, secretary.

Santa Clara Valley Veterinary Association, the fourth Tuesday of each month. Kay Beulley, N. Fourth and Gish Rd., San Jose, Calif., secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Central Florida Veterinary Medical Association, the first Tuesday of each month, time and place specified monthly. Jack H. McElyer, 5925 Edgewater Drive, Orlando, Fla., secretary.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, in St. Petersburg. R. L. Brown, 336 E. 15th St., Hialeah, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodsons Restaurant. P. S. Roy, 4443 Atlantic Blvd., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. T. R. Geci, 106B Catherine Ave., Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. J. J. McCarthy, 500-25th Street, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Frank Mueller, Jr., 4148 E. 8th Ave., Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. W. B. Martin, Jr., 3002 N. W. 6th St., Gainesville, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. H. S. Bryan, College of Veterinary Medicine, University of Illinois, Urbana, secretary.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P. O. Box 52, Pendleton, Ind., secretary.

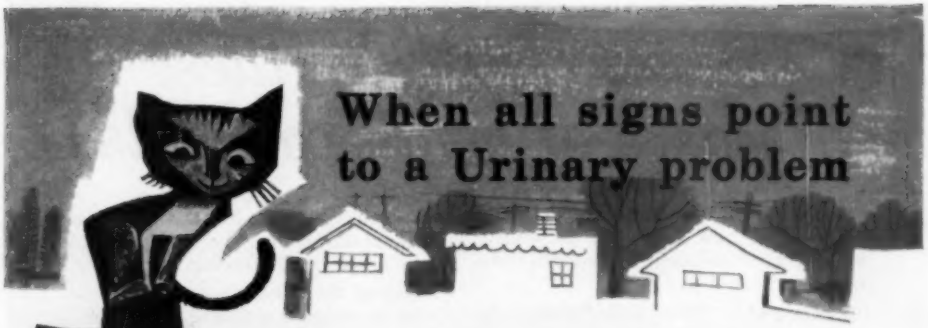
IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month, except June, July, and August, at 6:30 p.m., Breeze House, Ankeny, Iowa. John Herrick, Ames, secretary.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Association, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. Dr. J. G. Irwin, Iowa City, secretary.

Fayette County Veterinary Medical Association, the



the treatment of choice is

urised

veterinary

URISED...

Methenamine, salol, methylene blue and benzoic acid combat urinary tract invaders—reduce bacterial and pus-cell content, promote healing.

URISED...

Atropine, hyoscyamine and gelsemium relax smooth muscle along the urinary tract—relieve painful spasm quickly.

URISED...

Unexcelled for long-term therapy—no contraindications, no reports of toxic effects.

URISED...

Formation of alkaline calculi discouraged in acid urine.

To treat all urinary problems of small animals, specify **URISED,** *veterinary*

Sold to Graduate Veterinarians only

VETERINARY DIVISION

CHICAGO PHARMACAL COMPANY

5547 N. Ravenswood Ave.,
Chicago, Illinois

Pacific Coast Branch
381 Eleventh St.
San Francisco, Calif.

Send for literature and clinical trial supply of **URISED,** *veterinary*

proven results in these diseases of small animals

CANINE TRACHEOBRONCHITIS (KENNEL COUGH). In one study of 12 cases, FURADANTIN stopped the cough completely within 3 to 7 days.[1]

URINARY TRACT INFECTIONS. Extensively used in human genitourinary tract infections, FURADANTIN has also produced impressive clinical results in the treatment of bacterial nephritis and cystitis of dogs and cats.[2]

• • •

Preliminary data point to new indications for FURADANTIN. Various reports describe encouraging results with FURADANTIN in the treatment of vaginitis in the bitch and genitourinary tract infections of mares.[3] Another article concludes that FURADANTIN is an excellent adjunct to surgery in the treatment of prostatic abscess in the dog.[3]

Like all the nitrofurans, FURADANTIN is bactericidal to a wide range of both gram-negative and gram-positive organisms. It is nontoxic to kidneys, liver and blood-forming organs; and development of bacterial resistance is negligible.

Available as orange scored tablets of 10, 50 and 100 mg.; and Oral Suspension, bottle of 60 cc.

REFERENCES: 1. Mosier, J. E.: Vet. M. 50:603 (Nov.) 1955. 2. Bolleff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Pollock, S.: J. Am. Vet. M. Ass. 129:274 (Sept.) 1956.

FURADANTIN® veterinary

AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

NITROFURANS—A NEW CLASS OF ANTIMICROBIALS—NEITHER ANTIBIOTICS NOR SULFONAMIDES

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below—then turn the page ▶

History.—A male mongrel pup, 3 months old, suffered from persistent projectile vomiting of solid food. Vomition occurred shortly after the food was eaten. Fluids were usually retained. This condition had been evident since weaning. The dog was thin and dyspneic; otherwise, it acted normally. Two lateral radiographs were taken of the thorax. The second, shown here, was taken five minutes after barium solution was given by mouth.

(Diagnosis and findings are reported on next page)

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Constriction of the esophagus in the cardiac region, the result of which is a dilatation of the cervical portion of the esophagus and a diverticulum in the anterior thoracic area. The trachea is obscured by the radiopaque material; therefore, the presence of a constriction was not determined although the dyspneic condition suggested that one existed.

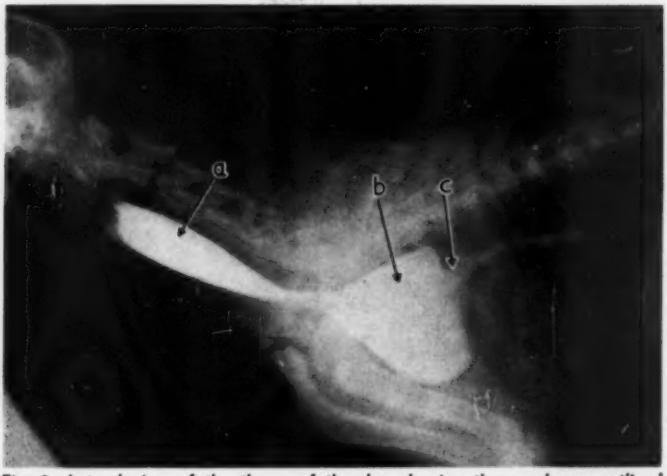


Fig. 2—Lateral view of the thorax of the dog showing the esophagus outlined with barium solution: esophagus (a); diverticulum (b); constricted esophagus (c).

Comment.—This is a typical anomaly of the aortic arches which causes strangulation of the esophagus and trachea. In early embryonic life, the principal arteries consist of paired longitudinal dorsal aortas, which fuse to form the anterior and posterior aortas and heart. At one point in this development, the esophagus and trachea are encircled by aortic arches. If embryonic development is interrupted, one or more of these arches may persist and cause a constriction of these organs.[1]

This case was submitted by Drs. Jack Seligman and George Sassu, Chicago, Ill.

---

[1]Linton, G. A.: Anomalies of the Aortic Arches Causing Strangulation of the Esophagus and Trachea. J.A.V.M.A., 129, (1956): 1-5.

dramatic relief

for posterior paralysis and other lamenesses in dogs of all ages

BUTAZOLIDIN®
brand of phenylbutazone*
(VETERINARY)

Butazolidin (Jen-Sal) brings to veterinary practice outstanding antiarthritic, anti-inflammatory, antipyretic and analgesic action in convenient tablet form. Already preferred in human medicine for its wide range of usefulness, Butazolidin's merit in the treatment of canine musculoskeletal disorders has now been definitely established by extensive clinical evaluation and research.

Butazolidin's active agent is rapidly and completely absorbed from the gastrointestinal tract. A single dose builds peak plasma concentrations in about two hours[1], and is metabolized at approximately 90 per cent per day[2].

One tablet per 5 lb. body weight in 3 divided doses daily (8 tablet daily maximum), gives dramatic relief from pain of posterior paralysis (vertebral disc syndrome) and arthritis without undesirable side effects[3]. Butazolidin is beneficial as prophylactic treatment for arthritic phenomena in old dogs[4] and for management of osteo-arthritis, spondylitis, fibrositis and myositis. It also affords an anti-inflammatory effect delaying and minimizing local tissue reaction to chemical and physical irritants[5].

Order Butazolidin in jars of 100 tablets from your nearest Jen-Sal Branch.

[1] J.A.M.A., 155, 17, Aug. 21, 1954
[2] Burns, J.J., Schulert, A., Chenkin, T., Goldman, A., and Brodie, B.B.: J. Pharmacol. & Exper. Therap., 100, 530, 1952
[3] Lieberman, L.L.: J. Am. Vet. M.A., 125, 128, 1954
[4] Joshua: Vet. Rec., Jan. 21, 1956
*U.S. Pat. No. 2,562,030
Under License from Geigy Chemical Corporation

Jen-Sal

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa. 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer, Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. Richard Baum, Osage, secretary.

KANSAS—Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Tuesday of each month. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kansas, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Varsailles Rd., Frankford, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. W. E. Bewley, P.O. Box "H," Crestwood, secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Chester R. Pleggе, 4249 Peck St., St. Louis 7, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Tuesday of each month. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kansas, secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from Octo-


My
HISTACOUNT®
Bookkeeping System
really saves me work
In just minutes, I get a complete financial picture of my practice . . . day by day . . . every day.
See for yourself what a work-saver Histacount is . . . mail the convenient coupon today . . . no obligation.
MAIL COUPON TODAY
PROFESSIONAL PRINTING COMPANY, INC.
NEW HYDE PARK, N. Y.
Gentlemen: Please send free Histacount Bookkeeping samples and literature, no obligation on my part.
Dr.
Address

How Anabolin™ Helps Regulate Metabolism

Anabolin is a balanced combination of three key hormones. Anabolin helps overcome endocrine imbalance in dogs that show depression, fatigue, lowered resistance, effect of stress and disease, or the slowdown of old age.

Hormones in metabolism – Nearly all metabolic functions depend upon, or are influenced by, the endocrine system. *Anabolism,* associated with growth and resistance to disease or other stresses, and *catabolism,* associated with loss of weight, lowered vigor and the undesirable effects of aging – both of these processes of metabolism are markedly affected by changes in endocrine balance.

The Anabolin rationale – Each Anabolin tablet contains a balanced combination of thyroid globulin (Proloid®), methyltestosterone and ethinyl estradiol. Thyroid globulin, the highly purified extract of thyroid, is a metabolic speed regulator influencing every cell in the body. The thyroid globulin in Anabolin helps overcome hypothyroidism manifested by such symptoms as sluggishness, obesity, poor hair quality, poor appetite. (Many older animals actually suffer from hypothyroidism, yet there may be no signs of thyroid deficiency.)

Thyroid globulin also triggers into action the combined anabolic effects of the androgen and estrogen in Anabolin. Ethinyl estradiol improves cell membrane permeability, influences all body tissues by helping transmit nutrients through the cell wall. Methyltestosterone plays an equally important role in protein metabolism. Absence or inadequacy of androgen is believed to be responsible for loss of protein from all cells, muscle, and bone in the aged animal.

The Anabolin formula – In Anabolin, the amounts and balanced proportion of thyroid globulin, methyltestosterone and ethinyl estradiol have been clinically selected so that only the desired anabolic effects are obtained. Anabolin contains Proloid (thyroid globulin) 16.0 mg. (¼ gr.), methyltestosterone 2.5 mg., and ethinyl estradiol 0.005 mg.

Clinical activity of Anabolin –

- *restores muscle tone, vigor, and sense of well-being*
- *permits better utilization of protein*
- *speeds recovery following infection, surgery, or injury*
- *improves appetite and alertness*
- *restores luster to the coat*

Use of Anabolin – Anabolin is supplied in bottles of 100 and 500 tablets. Tablets are small, are easily administered either directly by mouth or in food. The recommended daily dosage is 1 or 2 tablets. Beneficial results of Anabolin can usually be expected in 7 to 10 days after start of therapy.

Sold only through ethical veterinary distributors

Anabolin™

METABOLIC REGULATOR

DIVISION OF VETERINARY MEDICINE

WARNER-CHILCOTT

Laboratories MORRIS PLAINS, N. J.

ber through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck. James R. Tanzola, Upper Saddle River, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. R. Muller, 43 Church St., Lambertville, N. J., secretary.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. R. M. Sauer, secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

New York State Veterinary College, Annual conference for veterinarians. Cornell University, Ithaca. W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N. Y., dean.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. Joseph A. Lombardo, 411 Woodlawn Ave., Greensboro, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly, Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. John G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Thursday of each month in the Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. James R. Burgess, Rockingham, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every other month at 7:00 p.m., in the George Vanderbilt Hotel, Ashville, N. Car. Vilu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, Cincinnati, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, Toledo, Ohio, secretary-treasurer.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, Dayton, secretary.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April, and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, Cleveland, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, Akron, Ohio, secretary-treasurer.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. D. J. Kern, Killbuck, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the third Tuesday of every month, at 9:00 p.m. S. Segall, Youngstown, Ohio, secretary.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Forest H. Stockton, 2716 S.W. 29th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m., Ireland's Restaurant, Lloyds', 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinarian Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Marvin M. Corff, McMinnville, Ore., secretary

PENNSYLVANIA—Del-High Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

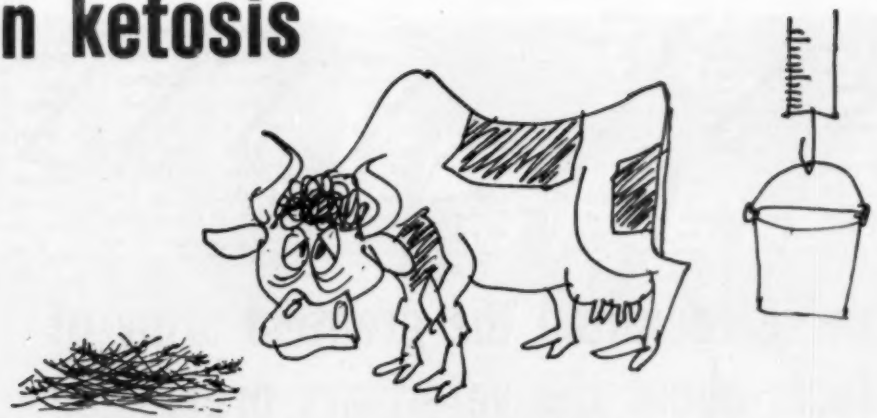
SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary Ct., Richmond 20, Va., secretary.

Northern Virginia Veterinary Conference, the second

in ketosis



When appetite fades and milk production falls . . . use

STERANE®

BRAND OF PREDNISOLONE

to put her back on feed and restore milk volume faster

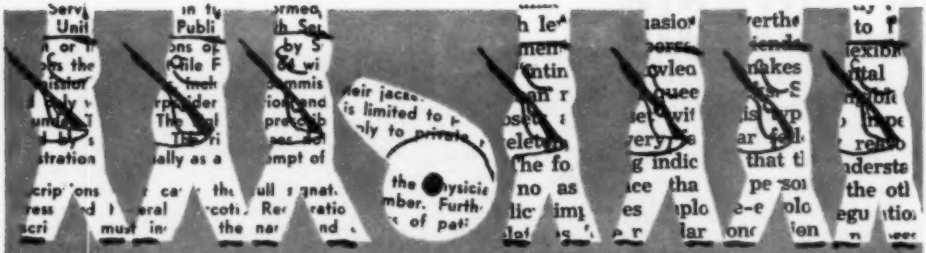
STERANE—for an early return to milk production.

STERANE, three to five times more potent than hydrocortisone and cortisone, stimulates glucose formation and helps re-establish physiological equilibrium. In clinical studies a single intramuscular injection of *50* to *100* mg. of Sterane promptly restored energy metabolism, with rapid reversal of ketotic symptoms in over 83 per cent of 299 cases treated.

STERANE INTRAMUSCULAR-VETERINARY *Sold to veterinarians only*

Pfizer

Department of Veterinary Medicine, PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N. Y.



we've recruited the greatest army of facts about the veterinary profession ever assembled in one publication...

YOU'LL WANT YOUR OWN COPY BECAUSE YOU KNOW THE VITAL IMPORTANCE OF BEING INFORMED

"The 1958 AVMA DIRECTORY is the most important, most complete reference publication concerning the veterinary profession ever made available on a mass distribution basis."

A strong statement? We think not. So confident are we of the urgent need for the 1958 AVMA DIRECTORY, that we have ordered the biggest press run in its eighteen-edition history. And a special, cordwain cover will be used to assure hard, long use for the next two years.

You'll find the 1958 DIRECTORY completely revised from cover-to-cover . . . to more effectively mirror today's fast-changing veterinary profession.

Easy-to-locate sections . . . easy-to-read type . . . more new features . . . more pages than ever before . . . will help make this the most vital, most valuable addition you can make to your personal library.

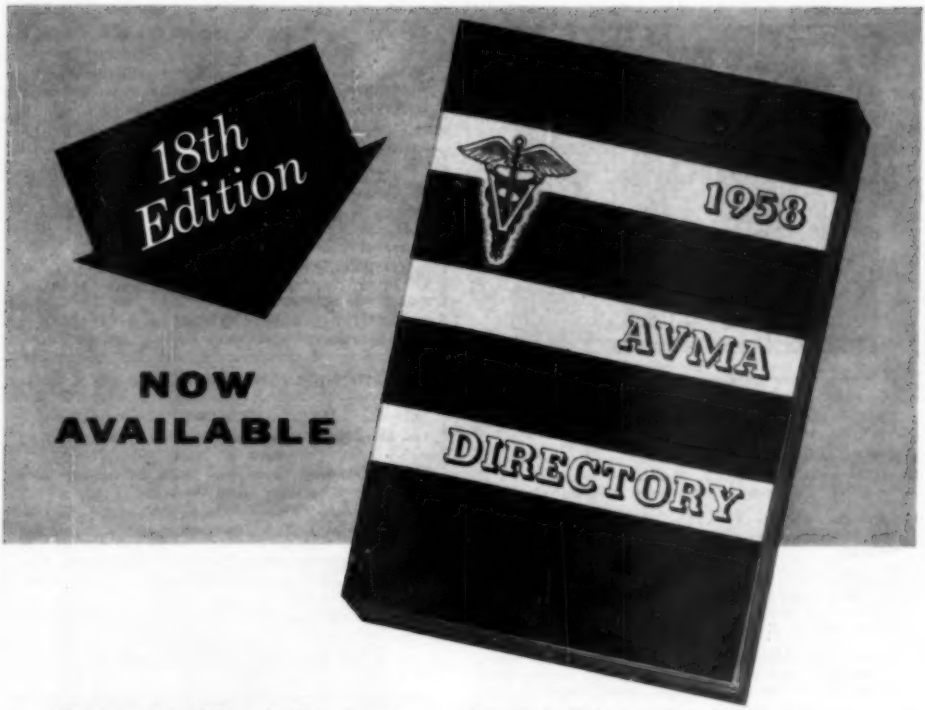
It is actually impossible to estimate its value as a one-stop source of all-around information concerning veterinarians, because it can be helpful to you in so many ways:

- When you are in need of current information concerning the functions of the Federal Veterinary Service.
- When you wish to contact Associations of related interest to veterinary medicine.
- When you would like to locate the name of an old friend or classmate.

Bear in mind, however, that this is NOT just another directory of names. That is just ONE feature of the dozens crammed into its more than 400 pages. And because this DIRECTORY offers so MUCH . . . and costs so LITTLE . . . you'll want to be among the first to order your copy. Use the handy coupon below – and do it NOW!

CHECK THIS PARTIAL LIST OF CONTENTS

√Constitution, Administrative Bylaws and Principles of Ethics
√Roster of the AVMA 1957-1958
√Veterinary Medical Associations
√Veterinarians in Charge of Animal Disease Control
√Federal Veterinary Service
√Public Health Veterinarians of the States and Territories
√Canada Veterinary Services
√Associations of Related Interest to Veterinary Medicine
√Digest of Veterinary Practice Acts
√Alphabetical and Geographical Index of Veterinarians
√Companies Supplying Products to Veterinarians



- ***Newest edition in 2 years!***
- ***Contains over 400 fact-filled pages.***
- ***So new, so up-to-date it obsoletes all previous Directories.***
- ***Completely revised from cover-to-cover.***
- ***Beautifully bound in cordwain (simulated leather) paper cover.***
- ***Still only $3.00 per copy—$15.00 to non-members.***

ORDER YOUR COPY NOW! FILL IN...CLIP...AND MAIL TODAY!

American Veterinary Medical Association
600 S. Michigan Avenue
Chicago 5, Illinois

Please send me _____ copies of the new 1958 AVMA DIRECTORY @ $3.00 per copy; $15.00 to non-members.

☐ Payment Enclosed ☐ Please Bill Me

(Print Clearly)

Name_____

Address_____

City_____ Zone_____ State_____

Tuesday of each month. Francis E. Mullen, 1130 S. Main St., Harrisonburg, Va., secretary-treasurer.

Northern Virginia Veterinary Society, the Second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blackburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle, Wash. William S. Green, 9637 S. E. 36th, Mercer Island, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. O. I. Bailey, P. O. Box 906, Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). R. J. O'Hern, P.O. Box 617, Cumberland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. W. E. Lyle, P. O. Box 107, Deerfield, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. E. S. Scobell, Rt. 2, Wausau, Wis., secretary.

CLASSIFIED ADVERTISEMENTS

PERSONAL WANT ADS—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

COMMERCIAL WANT ADS—$5.00 for the first 25 words, 25 cents for each additional word; $1.00 for use of box number.

THE TOTAL WORD COUNT must include complete box number address or personal address line.

Remittance must accompany ad.

DEADLINES

1st of month issue — 8th of month preceding date of issue.

15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

Assistant veterinarian for Maryland small animal hospital; excellent working conditions. Must be interested in long term employment; state qualifications and salary expected. Address "Box S 36," c/o JOURNAL of the AVMA.

Assistant wanted on staff of three veterinarians for well-equipped small animal hospital in Yonkers, N.Y. License not essential, but must be eligible for New York boards. Excellent working conditions. State qualifications and salary expected. Dr. James W. Boynton, 299 Central Park, Yonkers, N.Y.

General practitioner with Connecticut license wanted to take full charge of modern animal hospital and large animal practice. Living quarters for single man. Opportunity for lease or sale to qualified individual. Address "Box A 4," c/o JOURNAL of the AVMA.

County veterinarian, for brucellosis and tuberculosis control. Private practice permitted. Good salary. Excellent opportunity. Write to County Agricultural Agent, Clarksburg, W. Va.

Wanted—Positions

Experienced, young, small animal practitioner, without capital, seeks association with progressive older doctor, possible future purchase or partnership; Michigan, nearby states desired. Address "Box A 1," c/o JOURNAL of the AVMA.

D.V.M., M.S. veterinary pathologist, with research, practice, and diagnostic laboratory experience, desires position teaching, research, or related fields. Address "Box A 9," c/o JOURNAL of the AVMA.

1956 graduate, experienced, desires association leading to lease, purchase, or partnership in small animal practice; New York, New Jersey, Connecticut, or Pennsylvania. Address "Box A 2," c/o JOURNAL of the AVMA.

Michigan State graduate, 1956, desires position in predominantly small animal practice, East or Middlewest. Licensed, Wisconsin, Michigan. Ambitious, superior academic record, excellent references. Address "Box A 3," c/o JOURNAL of the AVMA.

Wanted—Practices

Want to buy or lease a going small animal hospital. Experienced, young, married veterinarian. Have capital available for right deal. Prefer Middlewest or California. Address "Box A 7," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

Mixed practice for sale in central Illinois. Inventory and practice, no real estate: $5,000. Gross last five years over $20,000 annually. Reason for selling: leaving private practice. Address "Box T 39," c/o JOURNAL of the AVMA.

Small animal hospital, with operating room and kennel, for sale in Hyde Park, New York; 3 large barns, presently setup for 20 dogs, could house 100. Ten-room residence, hardwood floors, hot-water heat; 1,000 ft. on highway; 14 acres; stream; $50,000. Address C. M. DePew, 20 South St., Rhinebeck, N.Y.

Lucrative general practice in North Carolina for sale. Rapidly growing area. Includes hospital and home. Address "Box A 10," c/o JOURNAL of the AVMA.

Established large animal practice for sale in friendly Indiana town. Includes home, garage, office, new chute, two-way radio, and drugs. Address "Box A 5," c/o JOURNAL of the AVMA.

Modern veterinary hospital for sale in south central Michigan. Large and small animal practice, established 15 years. Submit financial statement of ability or references. Details on request. Address "Box A 6," c/o JOURNAL of the AVMA.

Wanted—Books

Smith "Early History of Veterinary Literature," 4 volumes. Vegetius "Veterinary Art." Old veterinary books, any language. Address "Box A 8," c/o JOURNAL of the AVMA.

Book wanted—Harger's translation of Gouboux "Exterior of the Horse." Address Dr. William H. Wright, Box 37, Elmont, N.Y.

To insure prompt delivery, replies should be carefully addressed: Complete box number as given in the ad, AVMA, 600 S. Michigan Blvd., Chicago 5, Ill.

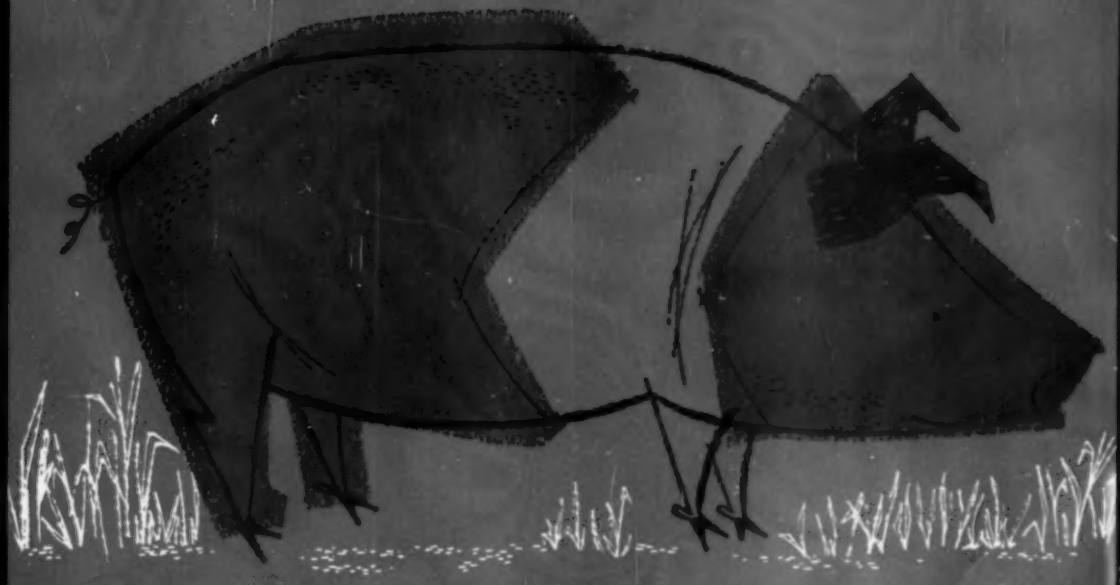
The first Landrace swine, the popular Danish meat-type breed, were imported to the United States in 1934. Now there are at least 22,000 in this country. —*Nat. Hog Farmer (July, 1957): 9.*

Singing Female Canaries.—When 5 young female canaries were each injected with testosterone phenylacetate (0.1 ml.), 2 began to chirp in nine days and all had started to sing in 12 days. Vigorous singing continued for a month then gradually decreased. Ten weeks after they had stopped singing, they were again injected and 1 bird sang in four days and all were singing in ten days. Untreated females did not sing.—*Science (June 28, 1957): 1299.*

Index to Advertisers in This Issue

SAFETY FIRST...

with lasting protection



Swivax*

The superior hog-cholera vaccine for SOLID immunity...

MODIFIED LIVE VIRUS • RABBIT ORIGIN • VACUUM DRIED

*REGISTERED TRADE MARK

(Licensed under U.S. Patent 2518078)

PITMAN-MOORE COMPANY

division of

ALLIED LABORATORIES, INC.

what?

an oral iodide that animals like to eat?

new Jen-Sal

PALADIDE

trade mark

Animals like to eat Paladide . . . day after day. Here's why. Unlike other iodides you've used, Jen-Sal's exclusive* new product is insoluble in saliva but wholly soluble and biologically available[1] in intestinal fluids.

Paladide supplies more than 16 gr. available iodine per oz. of convenient, easy-to-mix base. The active agent is bound closely to large particles, thus insuring uniformity of dosage. Furthermore, the unique stability of Paladide avoids the liberation of free iodine in stock packages[2]. The odor stays pleasant, and you are assured of full therapeutic value even after the package is opened.

Safe? Paladide's active agent is fully approved for human consumption. Carefully controlled animal tests for toxicity as well as therapeutic blood and tissue levels assure a safe, yet highly effective agent for iodine therapy[3].

Available now in 1 lb. jars or economical 25 lb. pails with special measuring scoop.

*U.S. Patent No. 2,772,167
[1]J. of Nutrition, 53:1, May, 1954.
[2]Armour Research Foundation Report Project No. C616.
[3]Jensen-Salsbery Research Data: In press.

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

Jen-Sal